



KINGDOM OF MOROCCO
MOHAMMED V UNIVERSITY OF RABAT
FACULTY OF MEDECINE
AND PHARMACY
RABAT



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TRAUMA-RELATED PSYCHIATRIC DISORDERS

THESIS

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FOR THE DEGREE OF
Doctor of Medicine

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Professor of Neurosurgery

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Professor of Psychiatry

President

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Member

Member

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

سُورَةُ الْبَقَرَةِ

قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ الْحَكِيمُ



صَدَقَ اللَّهُ الْعَظِيمُ



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Décembre 1984

Pr. MAAOUNI Abdelaziz
Pr. MAAZOUZI Ahmed Wajdi
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Médecine interne – [Clinique Royale](#)
Anesthésie -Réanimation
Pathologie Chirurgicale

Décembre 1989

Pr. ADNAOUI Mohamed

Médecine interne – [Doyen de la FMPR](#)

Janvier et Novembre 1990

Pr. KHARBACH Aïcha
Pr. TAZI Saoud Anas

Gynécologie -Obstétrique
Anesthésie Réanimation

Février Avril Juillet et Décembre 1991

Pr. AZZOUZI Abderrahim
Pr. BAYAHIA Rabéa
Pr. BELKOUCHI Abdelkader
Pr. BENSOUDA Yahia
Pr. BERRAHO Amina
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Anesthésie Réanimation
Néphrologie
Chirurgie Générale
Pharmacie galénique
Ophtalmologie
Gynécologie Obstétrique [Méd. Chef Mat.](#)

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Pharmacologie
Histologie Embryologie
Pharmacologie- [Dir. du Centre National](#)

PV Rabat

Décembre 1992

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Pr. EL OUAHABI Abdessamad
Pr. FELLAT Rokaya
Pr. JIDDANE Mohamed
Pr. ZOUHDI Mimoun

Chirurgie Générale [Doyen FMPT](#)
Anesthésie Réanimation
Neurochirurgie
Cardiologie
Anatomie
Microbiologie

Mars 1994

Pr. BENJAAFAR Noureddine
Pr. BEN RAIS Nozha
Pr. CAOUI Malika
Pr. CHRAIBI Abdelmjid

Radiothérapie
Biophysique
Biophysique
Endocrinologie et Maladies Métaboliques

Doyen FMPA

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Pr. ETTAYEBI Fouad
Pr. IFRINE Lahssan
Pr. RHRAB Brahim
Pr. SENOUCI Karima

Gynécologie Obstétrique
Chirurgie Générale– [Dir. du CHIS Rabat](#)
Immunologie
Chirurgie Pédiatrique
Chirurgie Générale
Gynécologie –Obstétrique
Dermatologie

Mars 1994

Pr. ABBAR Mohamed*
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Urologie [Inspecteur du SSM](#)
Pédiatrie

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Mars 1995

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Pr. BARGACH Samir
Pr. EL MESNAoui Abbes
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Pr. ZEGGWAGH Amine Ali

Décembre 1996

Pr. BELKACEM Rachid
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Pr. EL ALAMI EL FARICHA EL Hassan
Pr. GAOUZI Ahmed
Pr. OUZEDDOUN Naima
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Rabat

Novembre 1997

Pr. ALAMI Mohamed Hassan
Pr. BIROUK Nazha
Pr. FELLAT Nadia
Pr. KADDouri Noureddine
Pr. KOUTANI Abdellatif
Pr. LAHLOU Mohamed Khalid
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Pr. YOUSFI MALKI Mounia

Novembre 1998

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Janvier 2000

Pr. ABID Ahmed*
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Ophtalmologie
Gynécologie Obstétrique
Pédiatrie

Réanimation Médicale
Chirurgie Générale
Gynécologie Obstétrique
Gynécologie Obstétrique
Chirurgie Générale
Oto-Rhino-Laryngologie
Urologie
Ophtalmologie
Génétique
Réanimation Médicale

Chirurgie Pédiatrie
Ophtalmologie
Chirurgie Générale
Pédiatrie
Néphrologie
Cardiologie Dir. HMI Mohammed V

Gynécologie-Obstétrique
Ne Urologie
Cardiologie
Chirurgie Pédiatrique
Urologie
Chirurgie Générale
Pédiatrie
Psychiatrie Dir. Hôp.Ar-razi Salé
Gynécologie Obstétrique

Neurologie Doyen de la FMP Abulcassis

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Oncologie Médicale
Hématologie

Pneumo-phtisiologie
Pédiatrie
Pédiatrie
Pneumo-phtisiologie
Chirurgie Générale
Chirurgie Générale
Pneumo-phtisiologie
Neurochirurgie

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Novembre 2000

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Décembre 2001

Pr. BALKHI Hicham*
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Décembre 2002

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Cardiologie
Anesthésie-Réanimation
Pédiatrie - [Dir. Hôp. Cheikh Zaid Rabat](#)
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Pédiatrie

Anesthésie-Réanimation
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Chirurgie Générale
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Chirurgie Générale
Chirurgie Vasculaire Périphérique
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Pr. ABBASSI Abdellah
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 Pr. SBIHI Souad
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AVRIL 2006

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Gastro-Entérologie
 Anatomie Pathologique
 Chirurgie Générale
 Pédiatrie
 Chirurgie Pédiatrique
 Gynécologie Obstétrique
 Ophtalmologie
 Pédiatrie
 Oto-Rhino-Laryngologie
 Chirurgie Générale
 Pédiatrie
 Chirurgie Générale [Dir. de l' ERPPLM](#)

Ophtalmologie
 Anatomie Pathologique
 Oto-Rhino-Laryngologie
 Gastro-Entérologie
 Stomatologie et Chirurgie Maxillo-faciale

Ne Urologie
 Traumatologie Orthopédie
 Anatomie Pathologique
 Radiologie
 Gynécologie Obstétrique
 Pédiatrie
 Chirurgie Générale
 Pédiatrie
 Traumatologie Orthopédie
 Chirurgie Cardio-Vasculaire
 Ophtalmologie
 Pharmacie Clinique
 Chirurgie Générale
 Cardiologie

Chirurgie réparatrice et plastique
 Chirurgie Générale
 Rhumatologie
 Ophtalmologie
 Rhumatologie [Dir. Hôp. Al Ayachi Salé](#)
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 Cardiologie
 Biophysique
 Pédiatrie
 Radiologie
 Chirurgie Cardio-vasculaire
 Parasitologie
 Histo-Embryologie Cytogénétique
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Rhumatologie
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Pr. KISRA Mounir
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Octobre 2007

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Chirurgie Cardio – Vasculaire. *Dir. Hôp. Ibn Sina Marr.*
Gynécologie Obstétrique
Cardiologie
Cardiologie
Anesthésie Réanimation
Médecine interne
Microbiologie
Radiologie
Urologie
Pédiatrie
Psychiatrie
Chirurgie – Pédiatrique
Pharmacie Galénique
Parasitologie
Radiothérapie
Psychiatrie
Endocrinologie
Pneumo – Phtisiologie
Biochimie
Pneumo – Phtisiologie

Réanimation médicale
Pneumo phtisiologie
Traumatologie orthopédie
Parasitologie
Anesthésie réanimation
Biochimie-Chimie
Pharmacie Clinique
Ophtalmologie
Pharmacie galénique
Chirurgie cardio-vasculaire
Chirurgie Générale
Anesthésie réanimation
Psychiatrie
Chirurgie plastique et réparatrice
Radiothérapie
Oncologie Médicale
Dermatologie
Radiothérapie
Microbiologie
Réanimation médicale
Pneumo phtisiologie
Hématologie biologique
Biochimie-Chimie
Microbiologie
Microbiologie
Radiothérapie
Ophtalmologie
Chirurgie Générale
Traumatologie-Orthopédie

Pr. TLIGUI Houssain
Pr. TOUATI Zakia

Mars 2009

Pr. ABOUZAHIR Ali*
Pr. AGADR Aomar*
Pr. AIT ALI Abdelmounaim*
Pr. AKHADDAR Ali*
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Pr. AMINE Bouchra
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Mars 2010

Pr. Karim FILALI *

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Pr. CHEMSI Mohamed*
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Cardiologie

Médecine interne
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Chirurgie Générale
Neuro-chirurgie
Radiologie
Rhumatologie
Neuro-chirurgie [Dir. Hôp. Spécialités](#)

Anesthésie Réanimation
Anatomie
Biochimie-Chimie
Dermatologie
Chirurgie Générale
Traumatologie-Orthopédie
Chirurgie Vasculaire Périphérique
Hématologie clinique
Chirurgie Générale
Microbiologie
Médecine interne
Gynécologie obstétrique
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Gastro-entérologie
Pédiatrie
Pédiatrie
Chimie Thérapeutique
Chirurgie Cardio-vasculaire
Pédiatrie
Chirurgie Générale
Radiologie
Cardiologie
Pneumo-Phtisiologie

Anesthésie réanimation [Directeur de l'Ecole Royale du Service de Santé Militaire](#)

Anesthésie réanimation
Médecine interne
Physiologie
Microbiologie
Médecine Aéronautique
Biochimie- Chimie
Chirurgie Pédiatrique
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Radiologie
Chirurgie Plastique et Réparatrice
Urologie
Gastro-Entérologie

Pr. LAMALMI Najat
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Pr. MOUJAHID Mountassir*
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Decembre 2010

Pr. ZNATI Kaoutar

Mai 2012

Pr. AMRANI Abdelouahed
Pr. ABOUELALAA Khalil*
Pr. BENCHEBBA Driss*
Pr. DRISSI Mohamed*
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Pr. EL OUAZZANI Hanane*
Pr. ER-RAJI Mounir Chirurgie
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Février 2013

Pr. AHID Samir
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Pr. ECH-CHERIF EL KETTANI Najwa
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Pr. FIKRI Meryem
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Pr. IMANE Zineb
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Anatomie Pathologique
Anesthésie Réanimation
Chirurgie Générale
Anatomie Pathologique

Anatomie Pathologique

Chirurgie Pédiatrique
Anesthésie Réanimation
Traumatologie-Orthopédie
Anesthésie Réanimation
Chirurgie Générale
Pneumophthisiologie
Pédiatrique
Anatomie Pathologique

Pharmacologie [*Doyen FP de l'UM6SS*](#)

Toxicologie
Gastro-Entérologie
Anesthésie-Réanimation
Anesthésie-Réanimation
Réanimation Médicale
Anesthésie-Réanimation
Biochimie-Chimie
Hématologie
Anesthésie Réanimation
Néphrologie
Chimie Analytique et Bromatologie
Traumatologie orthopédie
Anatomie
Cardiologie
Réanimation Médicale
Pédiatrie
Anesthésie Réanimation
Radiologie
Neuro-chirurgie
Médecine Nucléaire
Chimie Thérapeutique
Toxicologie
Pédiatrie
Anatomie Pathologique
Anatomie
Anesthésie Réanimation
Radiologie
Physiologie
Radiologie
Médecine Nucléaire
Pédiatrie
Endocrinologie et maladies métaboliques
Microbiologie
Psychiatrie

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 Pr. OUBEJJA Houda
 Pr. OUKABLI Mohamed*
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Pharmacie

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 Pr. RAHMANI Mounia
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 Pr. ROSTOM Samira
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 Pr. ROUIBAA Fedoua*
 Pr. SALIHOUN Mouna
 Pr. SAYAH Rochde
 Pr. SEDDIK Hassan*
 Pr. ZERHOUNI Hicham
 Pr. ZINE Ali*

AVRIL 2013

Pr. EL KHATIB MOHAMED KARIM*

MAI 2013

Pr. BOUSLIMAN Yassir*

MARS 2014

Pr. ACHIR Abdellah
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 Pr. BOUCHIKH Mohammed
 Pr. EL KABBAJ Driss*
 Pr. FILALI Karim*
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 Pharmacie Galénique ***Vice-Doyen à la***

Génétique
 Ne Urologie
 Ophtalmologie
 Ne Urologie
 Physiologie
 Rhumatologie
 Anatomie Pathologique
 Gastro-Entérologie
 Gastro-Entérologie
 Chirurgie Cardio-Vasculaire
 Gastro-Entérologie
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Dedications





TO THOSE WHO HAVE ALWAYS BEEN BY MY SIDE

TO THOSE WITH WHOM I SHARED PAIN AND LAUGHTER

***TO THOSE WHO I HAVE AND WILL ALWAYS HOLD DEAR IN
MY HEART***



I dedicate this thesis



To my dear parents

KHADIJA and ABDELILAH



The best parents anyone can wish for

For their endless encouragement, love and sacrifices.



To my dear mother KHADIJA



Words can never describe the gratitude and luck

I feel for having you as a mother

For all the times I didn't realize your worth

For all the times you were my one and only

savior by my side

For all my pain that you and only you shared with me

My literal guardian angel

I'm sorry it took me this long to realize

Not only you are the greatest mother

But also my true best friend



*To my dear father **ABDELILAH***



Words can never describe the gratitude and luck

I feel for having you as a father

For always helping me

whenever I'm down

*For always being a source of motivation and strength during moments of despair
and discouragement*

*For being the best example that taught me to work hard for the things I aspire
to achieve*

You are and always will be my pride

For always being the greatest father

For being my best friend as well



To my big brother SIMO



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I had to say it since we all know, as much as Othmane doesn't like to show his
emotions,
he is, deep inside (giggity), one big softie.*

*I never let an opportunity go without
reminding you how proud I am of you
Not only for how far you've made it in life
But also for being a second role model to look up to*

*Now you have the chance to show off your fatherhood and role model skills with
our little baby princess Lilya*

No one can ever be more prepared for the journey



To my baby brother OTHMANE



Our very own Stewie (pun intended)

Even though you are my little brother

I practically look up to u all the time

Given how mature and strong you are

It's crazy that no matter how far you are

we are always in sync with each other

*I have always been proud of you and I know for a fact that you will never cease
to amaze me*

*I have been blessed with two brothers that I can honestly call my best friends
and actually mean it*

And last but not least

You are undoubtedly my music soulmate (pause)



To my sister in law SOPHIA



*Our family is blessed for welcoming you among us
Not only for being a great person
But for also being the sister Othmane and I never had*



To my princess goddaughter LILYA



*I am your forever protector
I am your forever guardian
Everything I have and everything I am is yours, forever
You are the pride of our family and our everything
Always you.*



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I will always be grateful to have you in my life*

*I want you to know how much I have enjoyed our time together, and how
excited I am to keep doing so*

For the rest of our lives

We were always

Bound 2



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Jury president



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and mentor for my thesis*



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Professor of Psychiatry
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Jury member



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Jury member



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I hope, through this work, to live up to your expectations



List of abbreviations



Abbreviations

AA	: Alcoholics Anonymous
ACE	: Adverse childhood experiences
ASD	: Acute stress disorder
BAI	: Beck Anxiety Inventory
BDI	: Beck Depression Inventory
BDIPC	: Beck Depression Inventory for Primary Care
BPD	: Borderline personality disorder
CBT	: Cognitive behavioral therapy
CPR	: Cardiopulmonary resuscitation
CRPS	: Chronic regional pain syndrome
CT	: Computed Tomography
DBT	: Dialectical behavior therapy
DSM-V	: Diagnostic and Statistical Manual of Mental Disorders 5 th edition
DVT	: Deep vein thrombosis
ECMO	: Extracorporeal membrane oxygenation
ECT	: Electroconvulsive therapy
EMDR	: Eye movement desensitization and reprocessing
ER	: Emergency room
FDA	: Food and drug administration
GAD	: Generalized anxiety disorder
GCS	: Glasgow Coma Scale
HADS	: Hospital Anxiety and Depression Scale
HPA	: Hypothalamic-pituitary-adrenal
ICU	: Intensive care unit
IES	: Impact of Event Scale
IPT	: Interpersonal therapy
LSD	: Lysergic acid diethylamide

MAOI	: Monoamine oxidase inhibitors
MDMA	: Methylenedioxymethamphetamine
MRI	: Magnetic Resonance Imaging
NA	: Narcotics Anonymous
NCCMH	: National Collaborating Centre for Mental Health
NRS	: Numerical rating scale
PD	: Panic disorder
PDSQ	: Psychiatric Diagnostic Screening Questionnaire
PE	: pulmonary embolism
PFC	: Prefrontal cortex
PTSD	: Post-traumatic stress disorder
SASRQ	: Stanford Acute Stress Reaction Questionnaire
SCID	: Structured clinical interview for DSM
SES	: Socioeconomic status
SNRI	: Serotonin-Norepinephrine Reuptake Inhibitors
SNS	: Sympathetic nervous system
SSRI	: Selective Serotonin Reuptake Inhibitors
TBI	: Traumatic brain injury
TCA	: Tricyclic antidepressants
TSQ	: Trauma Screening Questionnaire
VAS	: Visual analog scale
VRS	: Verbal rating scale
WHO	: World Health Organization



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Introduction



An accident-related trauma is an event often beyond human control that manifests itself in bodily damage. Whether intended or not, it results from a variety of external forces, which can be a shock, a blow, pressure..., and can endanger the victim's life. In addition to the physical injuries, it refers to the emotional and psychological harm as well, that can occur as a result of the traumatic event such as a car accident, natural disaster, or violent crime... The subject may experience an intense physical and/or psychological threat, sometimes even as far as living a near-death experience.

Although most accidents and acts of violence are predictable and can be avoided through preventative measures, they represent one of the biggest health hazards in Morocco, one of the main causes of mortality and morbidity. Road traffic accidents being the major one. [1]

Generally, the physical repercussions are handicapping and can vary depending on the severity and nature of the accident. However, the psychological outcome can be significant, long-lasting and vastly unpredictable, often remaining ignored and therefore not processed [32,33,34]. This will lead to long-term and chronic consequences, that will be responsible of a severe morbidity that drastically alters the recovery process.

Various psychiatric disorders can occur due to the traumatic experience, to the circumstances of the event, and in some cases due to the neglect faced in the aftermath by professionals. Acknowledging these disorders and seeking professional help after a traumatic accident is important in order to minimize the impact of trauma and improve the chances of recovery.



Chapter one: Major traumatic injuries



I-Brain injury

1-Definition:

A brain injury is a damaged cerebral tissue or a cerebral malfunction.

It can result from of a shock between the brain and the skull, an open fracture, a penetrating head trauma or an acceleration-deceleration mechanism [2]. The majority of brain injuries are due to road traffic accidents, body falls, body fights and sports-related accidents. [2]

The physical energy brought into play during the accident will cause lesions at the level of the brain and its envelops. When these lesions are tolerated, the patient will survive with or without sequels. Otherwise it would lead to death [3]. It is considered a severe and life-altering injury, due to the potential wide range of effects that it can have on a person's physical, cognitive, emotional and social functioning. It can lead to permanent disability and even death [3]. Trauma-related brain injuries are the first cause of damage to the nervous system. Their morbidity and mortality are significant [3]. The World Health Organization (WHO) estimates that TBIs account for about 10% of all deaths from injury and are a leading cause of disability and death among young adults. It is a serious public health problem being a major source of disability and death worldwide [3].

2-Anatomy of the head:

The head is the upper part of the human body and contains the brain, eyes, ears, nose, and mouth. The skull is the bony structure that surrounds and protect the brain. It is made up of several bones, including the frontal bone, parietal bones, temporal bones, and occipital bone. The skull also contains several openings, including the orbits (eye sockets), nasal cavities, auditory canals (ears), and the mouth.

The brain is the most complex organ and controls all functions of the body. It is protected by the skull and cushioned by cerebrospinal fluid.

The brain is divided into several parts, including the cerebrum, cerebellum, and brainstem. The cerebrum is the largest part of the brain and controls functions such as movement, sensation, and thought. The cerebellum is responsible for coordination and balance, and the brainstem controls essential functions such as breathing and heart rate.

The face is the front part of the head, containing the eyes, ears, nose, and mouth. The orbits are bony cavities in the skull, in which the eyes are situated. The ears are located on the sides of the head, and the nose and mouth are located in the front.

The head is connected to the rest of the body by the neck, which contains the spinal cord and supports the head. The cervical spine is the uppermost part of the spine, and supports the head and allows for its movement.

The craniofacial skeleton is formed by bones welded all together and two moving bones, the hyoid bone and the mandible.

The brain is isolated from the bone structures and surrounded by the meninges, which are the three layers that nurture and protect the brain and spinal cord from injury and help to keep them in place. They are called the dura mater (the outermost layer), arachnoid mater (the middle layer), and pia mater (the innermost layer) [4].

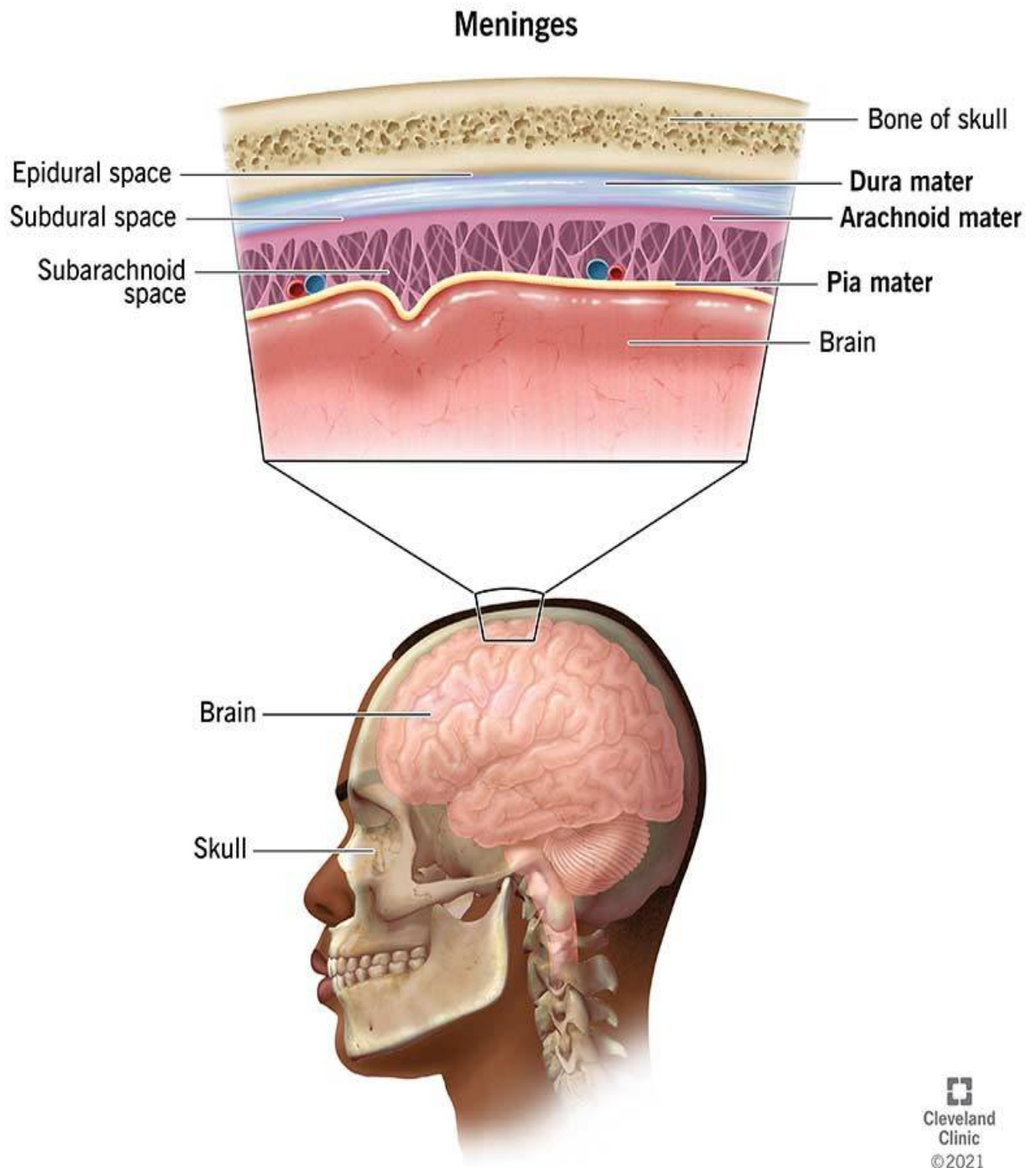


Figure 1: Drawing of the head and the three Layers of Meninges

3-Consequences of brain injury:

The consequences of traumatic brain injuries can include physical, cognitive, and emotional symptoms. The severity of TBI can range from mild (concussion) to severe (coma or vegetative state). The extent of recovery can vary greatly depending on the severity of the injury, the specific areas of the brain that were affected, the age of the individual, and other factors. [5]

Some individuals may recover completely, while others may experience long-term impairments, with the possibility of persistent vegetative state, which lead to permanent disabilities that raise long term mortality and lowered life expectation [6]. Rehabilitation and therapy, such as physical therapy, occupational therapy, speech therapy, and cognitive therapy, can help to improve cognitive and physical function.

The consequences of a TBI or repetitive insults can cause various secondary pathological conditions including seizures, neurodegenerative diseases, neuroendocrine dysregulation and psychiatric disorders. [7]

-Physical symptoms of TBI can include a wide range of symptoms, as the brain controls all bodily functions. Headaches are a common symptom and can be caused by inflammation or swelling of the brain. Dizziness, balance problems, coordination difficulties and changes in vision or hearing can occur as a result of damage to the parts of the brain that control these functions. Fatigue can be caused by the brain needing to work harder to compensate for the injury, and difficulty sleeping can be caused by physical pain, brain inflammation or emotional distress. [8]

-Cognitive symptoms can include difficulty with memory, as patients with traumatic brain injuries frequently suffer from an anterograde amnesia or the inability to retain new information, particularly during the confusion period that follows the accident. We can also witness a retrograde amnesia, where the patient is incapable to recall the events that took place just before the accident. Therefore, depending on the severity and the affected area, the ancient memories are less susceptible to be affected than the ones from before the accident. [9]

Attention and concentration difficulties can also occur, as a result of damage to the parts of the brain that control these functions. Problem-solving and executive function, which refers to the ability to plan, organize, and complete tasks, may be affected as well. [8]

These alterations generate a global deficit of the patient's cognitive performance. Impairment is generally associated with the gravity of the trauma, which also highlights the patient's frustration regarding the tasks easily handled prior to the trauma, that he can no longer manage to do. [9]

-Occasionally, patients with TBIs suffer from uncontrolled clinical manifestations that can be accompanied by a more or less long momentary loss of consciousness. They are found in severe TBIs especially in cases of open trauma, which lead to cortical lesions. It is stated that the more severe the TBI, the greater the chance the person may develop post-traumatic epilepsy. Many factors play a role in its occurrence such as age, genetic predisposition... [8]

-Emotional symptoms of TBI can include mood swings, irritability, anxiety, and depression. These symptoms can occur as a result of the injury itself or as a secondary reaction to the changes in physical and cognitive function [10]. The brain's emotional center, the limbic system, can be affected by TBI, leading to emotional instability. [11]

The severity of TBI can range from mild (concussion) to severe (coma or vegetative state). Concussion is a type of mild TBI that typically resolves within a few days or weeks. More severe TBI can result in a loss of consciousness, persistent cognitive and physical impairments, and long-term disability. It is important to note that TBI can have long-term effects on an individual's quality of life and their ability to function in their daily life and work. This can have a significant impact on their family and loved ones as well. [12]

II-Back injury

1-Definition

A traumatic back injury is the impairment of the spine's osteo-disco-ligamentous system, caused by a sudden traumatic event, such as a fall, road traffic accidents, or sports injury. Some causes are anecdotal and seasonal such as shallow water dives in the summer and cherry tree falls [13]. This type of injury can range from a mild sprain or strain to a more severe injury such as a spinal cord injury or herniated disc, which bring into play the functional and vital prognosis, given the neurological consequences they can cause.

This type of injuries will conclude in two consequences:

The first one immediately threatens the functional and vital prognosis by immediate neurological lesions. The second one, the instability, which can generate the first threat when it goes unnoticed [13]; Hence the mandatory awareness and caution when handling the patient in the scene of the accident and during transport.

The cervical spine injuries are frequent and can be severe and potentially life-threatening. They are considered the most dangerous among all types of spinal injuries given the proximity to the brain and the cervical spine's vulnerability [14]. As a general rule, the lower the lesion, the more the functional prognosis outweighs the vital prognosis. [13]

Back injuries can cause permanent damage to the spinal cord and can lead to permanent disability or even death if left untreated. They can result in damage to the spinal cord and the nerves that branch out from it, which can lead to a loss of sensation, movement, and even paralysis. [15]

2-Anatomy of the spine

The spine is a long column formed by 33 little back bones, called vertebrae. They are welded all together by fibrous ligaments and discs that are known for their shock absorption feature.

It supports the body's weight and movements, serves as an anchor for several muscles and protects the spinal cord from potential damages.

2-1-The spine:

-The cervical spine includes 7 vertebrae and articulates in between the head and the thoracic spine.

-The thoracic spine articulates in between the cervical and the lumbar spines. It includes 12 vertebrae, which are distinguished from their lumbar and cervical counterparts by their articulation with the ribs.

-The lumbar spine articulates in between the thoracic spine and the sacrum and includes 5 vertebrae.

-The sacrum articulates with the lumbar spine above, the coccyx below, and includes 5 vertebrae welded all together. [4]

2-2-The spinal cord:

The spinal cord is a long bundle of nerve tissue located in the spine.

It's the main route of nerve signals transmission between the brain and the rest of the body. It is also the center of reflexes.

It begins at the base of the skull, where it connects to the brain through the brainstem, then passes through the hollow channel in the center of the spine, which is called the spinal canal. The spinal cord is shorter than the vertebral column, therefore it does not cross it entirely ending at conus medullaris, near the first or second lumbar vertebra.

Any fracture of the spine can therefore lead to a section of the spinal cord, with life-long consequences like quadriplegia (all limbs paralysis) or paraplegia (lower limbs paralysis) depending on the level of the attack [16].

That is why the spine ensures both static and dynamic roles, such as the upright position support, articulation with the head and the pelvis, nervous system protection, respiratory role (thoracic cage bearing and respiratory muscles insertion), body orientation and postural adaptation to the environment [4].

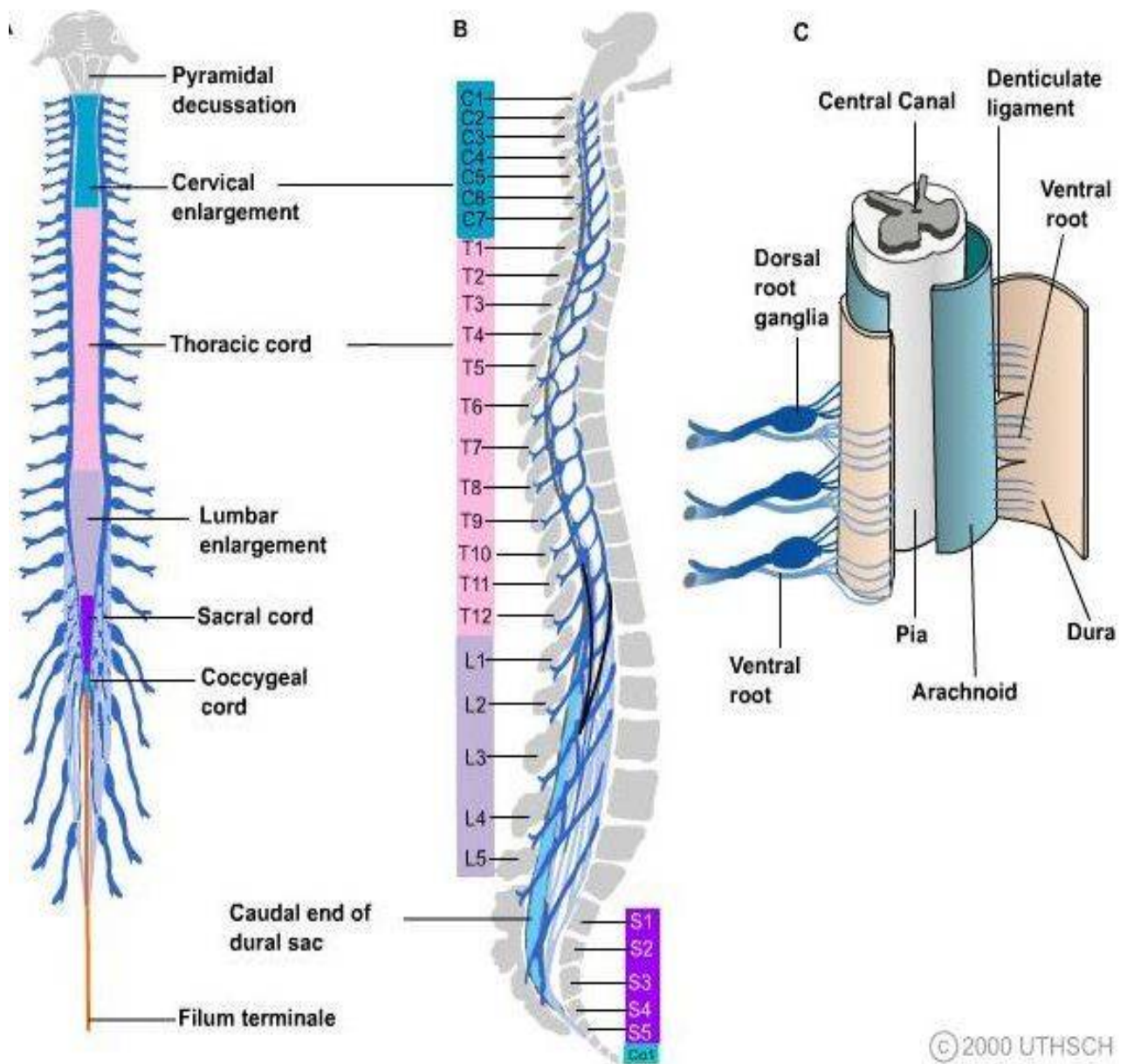


Figure 2: Drawing of the spinal cord, its spinal roots and the spinal vertebrae. Section of the spinal cord, its meninges and the dorsal and ventral roots of three segments

3-Concequences of back injury:

Traumatic back injuries can have a wide range of consequences, depending on the severity and location of the injury [18]. Such as:

-Fractures: Trauma to the back can cause fractures in the vertebrae, which can lead to nerve compression and spinal cord damage. Vertebral fractures can be classified as stable or unstable. A stable fracture is one that does not cause significant displacement of the vertebral bones and is less likely to cause nerve damage or spinal cord injury. An unstable fracture is one that causes significant displacement of the vertebral bones and can cause nerve damage or spinal cord injury. Fractures of the spine can also cause instability in the spine which can lead to chronic pain and disability. [19]

-Soft tissue injuries: Strains and sprains to the muscles, ligaments, and tendons in the spine can cause pain, stiffness, and limited mobility. Soft tissue injuries can occur from overuse, repetitive motions, or a single traumatic event. They are characterized by inflammation, pain, and muscle spasm. Soft tissue injuries can be treated with rest, ice, physical therapy, and medication. [20]

-Nerve damage: Trauma to the back can damage the nerves that run through the spinal cord, leading to numbness, tingling, and weakness in the limbs. This can be caused by nerve compression, which can occur with fractures, dislocations, or herniated discs. Nerve damage can also result in bowel or bladder incontinence. [21]

-Paralysis: In severe cases, trauma to the back can cause partial or complete paralysis of the limbs, depending on the location and severity of the injury [18]. Paralysis occurs when the spinal cord is damaged and the brain's ability to communicate with muscles is lost. The degree of paralysis depends on the level of injury to the spinal cord. Injuries in the upper spinal cord can cause quadriplegia while injuries in the lower spinal cord can cause paraplegia. [17]

A Complete spinal cord injury may result in quadriplegia or complete paraplegia, complete anesthesia below the injury and urinary retention [17].

When there is the slightest hint of voluntary motor and/or sensory function below the lesion, it refers to an incomplete spinal cord injury, which can result in central cord syndrome (brachial diplegia and complete lower limbs deficit), anterior cord syndrome (quadriplegia or complete paraplegia while the vibratory and proprioceptive sensations are preserved) or brown-Sequard syndrome (hemiplegia with proprioceptive deficits on the lesion side and temperature and pain deficits on the contralateral side). [17]

-Chronic pain: Even after the initial injury has healed, some people may experience chronic pain in their back. This can be caused by ongoing nerve damage, ongoing inflammation, or the development of chronic conditions such as fibromyalgia or chronic regional pain syndrome (CRPS). [21]

III-Chest injury:

1-Definition:

A traumatic chest injury is an injury to the chest area, which includes the heart, lungs, ribs, and other organs and structures in the area.

These injuries can be caused by a variety of mechanisms, such as blunt force trauma, penetrating trauma, or a combination of both. [22]

Blunt force injuries can result in pulmonary or cardiac contusions, which can be life-threatening conditions by causing difficulty breathing, a decreased ability to oxygenate the blood, irregular heartbeats and decreased cardiac output. [22]

Penetrating chest injuries occur when an object pierces and enters the thoracic cavity, potentially injuring organs such as the lungs and heart, or the aorta.

A simple rib fracture is the most common chest injury [22]. The treatment of a fractured rib is not always surgical. Painkillers are prescribed and the bone repairs itself within weeks. If the trauma is more significant, such as multiple rib fractures or flail chest, surgical stabilization can be performed. A chest X-ray can detect any associated lesions such as pneumothorax or pleurisy.

In this case, a chest tube may need to be placed. This gesture is often enough to manage the problem. [23]

2-Anatomy of the chest:

The thorax is bounded above by the shoulder girdle and the first pair of ribs, behind by the thoracic spine and the posterior arch of the ribs, laterally by the ribs, and in front by the sternum. Thus is delimited a real bone cage called rib cage, having the ribs as bars, thereby protecting the organs it contains.

The thorax contains the lungs, each resting on one side of the spine within the ribs which bounds the pulmonary groove.

In between, descending from the larynx, the trachea divides into two main bronchi. This tracheal bifurcation, sends to each lung its main bronchus at the hilum level.

The diaphragm, which is the main respiratory muscle, refers to the lower limit of the thorax. Given the respiratory movements, this limit is mobile during breathing. The heart is linked to the diaphragm through its pericardium, where the diaphragm is lower on the left side than the right, allowing more room for the heart.

Behind the trachea and in front of the spine, the esophagus descends from the pharynx to the stomach, after crossing the diaphragm at the 10th thoracic vertebra level, via the esophageal hiatus.

The thorax can be divided into several regions. Laterally, we find the pulmonary grooves containing the lungs and their pleura. Between the two, we distinguish an anatomical region of great importance, called the mediastinum, where lie the heart, the trachea, the esophagus, and the great vessels. [4]

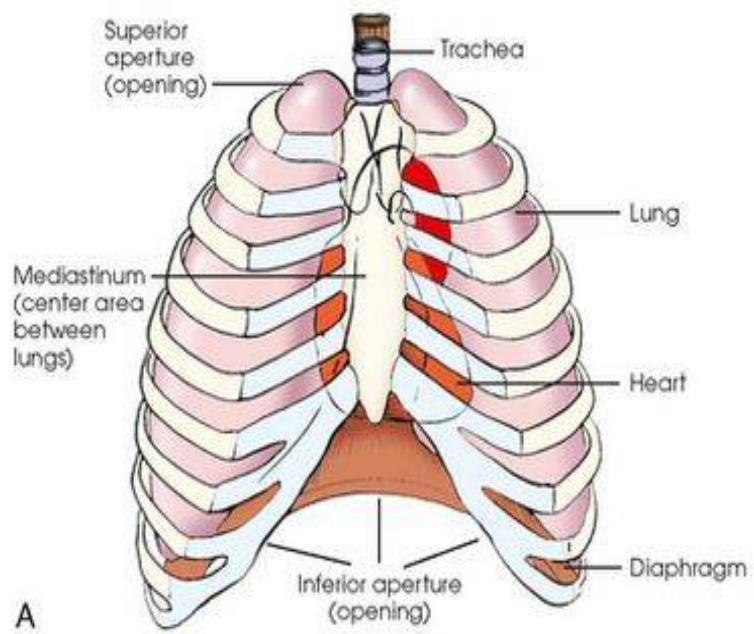


Figure 3: Drawing of the thoracic cavity

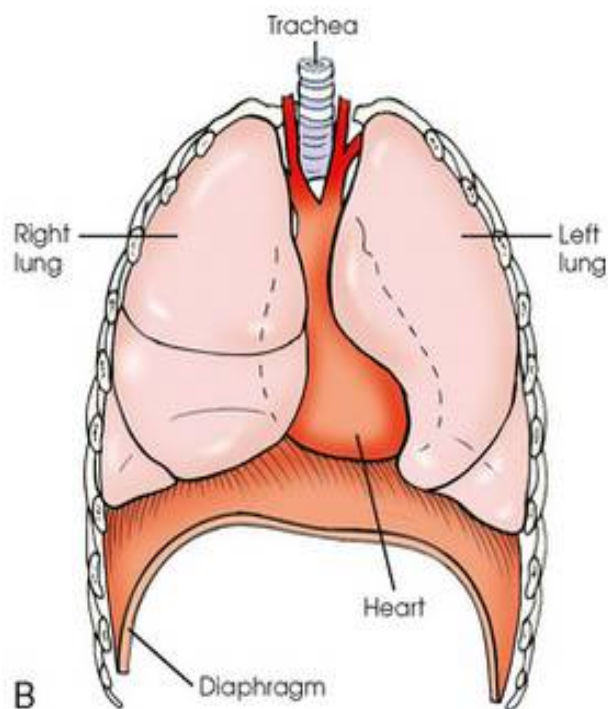


Figure 4: Drawing of the thoracic cavity with anterior ribs removed

3-Consequences of chest injury:

Traumatic chest injuries can have a wide range of consequences depending on the severity of the injury and the specific organs or structures that are affected. Some common consequences of traumatic chest injuries include:

-Hemothorax: Blood accumulates in the pleural cavity due to a tear in the blood vessels that run through the chest. This bleeding can be massive, causing shock, especially when the hemothorax is significant which will impair the breathing mechanisms as well.

This can lead to difficulty breathing, as the blood in the pleural cavity can compress the lung. Hemothorax can also lead to decreased oxygenation of the body's tissues, as the blood in the pleural cavity can interfere with the lung's ability to exchange oxygen and carbon dioxide. This can cause chest pain, shortness of breath, and decreased lung function. [24]

-Pneumothorax: Air leaks into the pleural cavity due to a tear in the lung or the chest wall. This can cause the lung to collapse, leading to difficulty breathing and decreased oxygenation. Pneumothorax can also cause chest pain, shortness of breath, and decreased lung function. [24]

-Flail chest: When a portion of the rib cage is broken in multiple places, it can move independently of the rest of the chest.

This can cause difficulty breathing, as the flail segment can interfere with the lung's ability to expand. Flail chest can also cause pain and instability in the chest. Treatment includes pain management, mechanical ventilation and in severe cases, surgery. [24]

-Tension pneumothorax: This occurs when the pressure inside the pleural cavity continues to increase, leading to collapse of the lung and decreased blood flow to the heart and brain. Tension pneumothorax disrupts breathing as well as circulation. It is a life-threatening condition and requires immediate treatment, which includes needle decompression or chest tube placement. [24]

-Cardiac contusion: This occurs when the heart is injured, often as a result of blunt force trauma to the chest. Cardiac contusion can lead to arrhythmias, decreased heart function, and even cardiac arrest. Treatment includes supportive care such as oxygen and fluid therapy and in severe cases, surgery. [24]

-Aortic injury: The aorta is the main blood vessel that carries blood from the heart to the rest of the body. Aortic injury can occur as a result of blunt or penetrating trauma to the chest and can lead to bleeding, decreased blood flow to the body's organs, and death if not treated promptly. [24]

-Pulmonary contusion: This occurs when the lungs are injured, often as a result of blunt force trauma to the chest. Pulmonary contusion can lead to difficulty breathing, decreased oxygenation, and increased risk of pneumonia. Treatment includes supportive care such as oxygen therapy, mechanical ventilation and in severe cases, surgery. [24]

In general, traumatic chest injuries can be life-threatening and require prompt medical attention. The treatment options vary depending on the specific injury and the severity of the injury.

IV-Bone / skeleton injury:

1-Definition

Traumatic bone and skeleton injuries include fractures, dislocations, and sprains, resulting from a sudden and severe impact or force, such as a body fall, blow, or car accident.

A bone fracture is a split in the bone's normal continuity. It occurs when the bone is broken or cracked. The severity of a fracture can vary, from a simple hairline crack to a complete break of the bone. It can be extra-articular or a joint fracture. A joint fracture is more likely to be dangerous due to the high probability of joint mobility impairment, associated dislocation, vessels and nerves lesions, which often lead to a longer and more difficult rehabilitation problem [25]. A simple fracture is a complete fracture in which the bone is broken into two fragments. A comminuted fracture is a complete fracture in which the bone is broken into multiple fragments. [25]

A bone amputation refers to the surgical removal of a limb or limb segment due to injury or trauma, such as a severe fracture or crush injury. This type of amputation is typically performed as a life-saving measure when the damaged limb can no longer function properly or is at risk of infection.

2-Anatomy of the limbs

-The upper limbs are connected to the upper body through the shoulders. Each upper limb is made up of several bones. Its girdle skeleton is made of the scapula clavicle (collarbone), and the scapula (shoulder blade).

Its loose portion is made of the humerus as in the upper arm bone, the ulna and the radius as in the forearm bones, and the carpal, metacarpal and phalanges bones in the hand.

The humerus bone connects the glenohumeral joint (a true synovial ball-and-socket style extremely mobile joint) and the elbow joint, while the radius and ulna connect the elbow joint and the wrist joint. The hand movements involve numerous interdependent joints, the radiocarpal joint and the intercarpal joints. [4]

-The lower limbs are connected to the body at the hip girdles. Similarly, each lower limb is made up of several bones. Its girdle skeleton is made of the two hip bones (pelvis) and the sacrum. Its loose portion is made of the femur as in the thigh bone, the patella at the knee joint, the tibia and the fibula as in the leg bones, the tarsals, metatarsals and phalanges as in the foot bones.

The hip joint unites the femur to the hip bone. It is a synovial spheroid joint combining stability and mobility. This stability is so substantial that it needs a violent trauma to cause its dislocation. [4]

The knee joint unites the femur, the tibia and the patella. It is a synovial joint that combines a perfect stability and vast mobility.

The leg bones are united by the two proximal and distal tibiofibular joints, and the crural interosseous membrane.

The ankle joint unites the talus bone to the fibula and tibia. It plays a key role in walking. The tarsal joints guide the foot on the transverse and frontal plan, while the ankle joint guides it on the sagittal plan. [4]



Figure 5: Segments and bones of upper limb

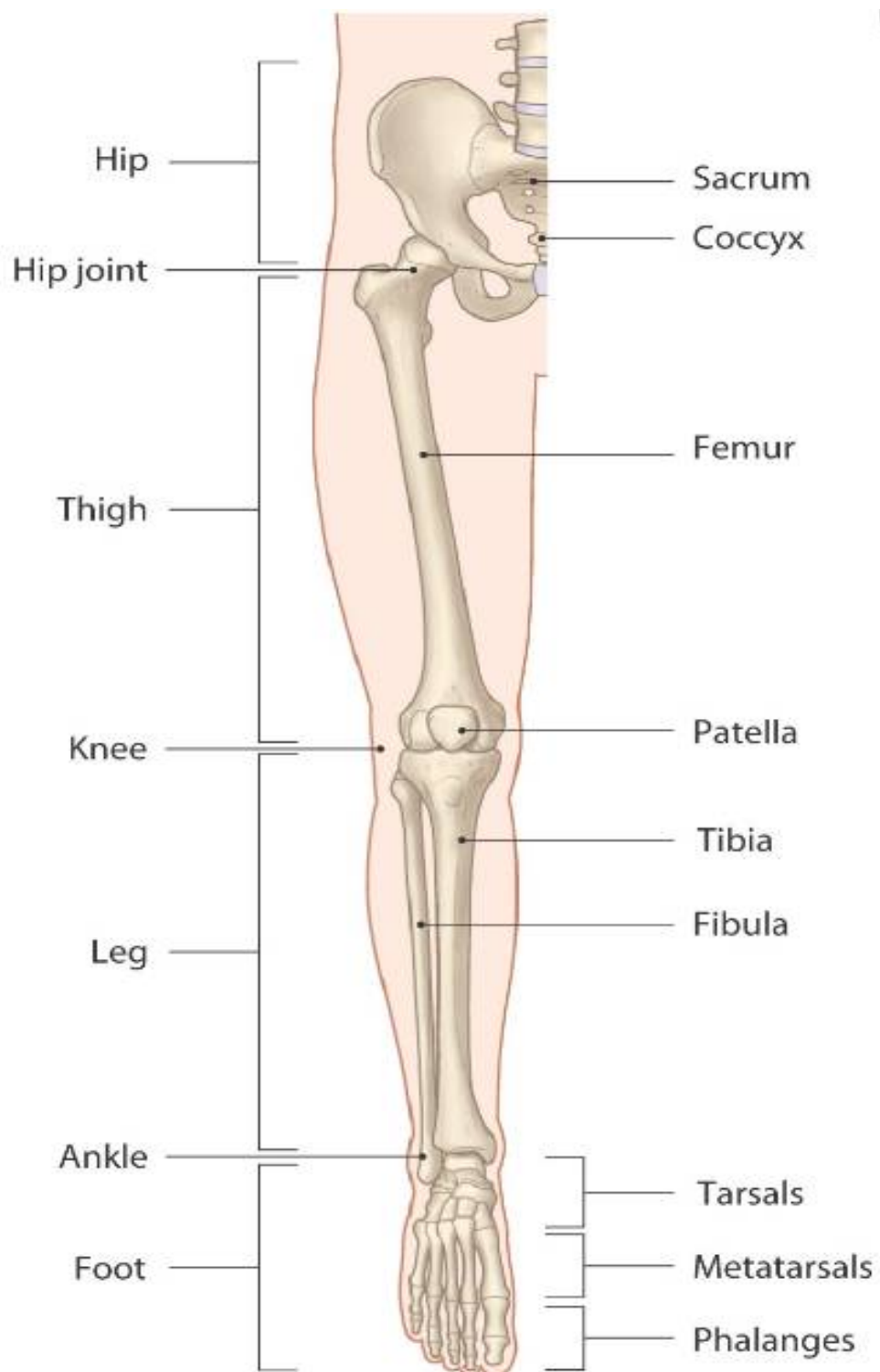


Figure 6: Segments and bones of lower limb

3-Concequences of bone injuries

Traumatic bone and skeleton injuries can have a wide range of consequences, depending on the severity and location of the injury. Some potential consequences include:

-Pain: it is one of the most common symptoms encountered after a bone injury [26]. The pain may be localized to the area of the fracture or may radiate to other areas of the body. It can be caused by the injury itself, the pressure and movement of the broken bone on surrounding tissue, or the inflammation that occurs in the area of the fracture. The intensity of the pain varies depending on the location and severity of the fracture. It can be severe immediately following the injury or develop gradually over time. [26]

-Nerve damage: A fracture can cause damage to nearby nerves by compressing or severing them. This can cause numbness, tingling, weakness, or loss of sensation in the affected area. The extent of the nerve damage can vary depending on the location and severity of the fracture, as well as the duration of the compression or injury to the nerve. In some cases, nerve damage may be temporary, but in other cases it can be permanent. [26]

-Tissue damage: A fracture can also cause damage to the surrounding soft tissue such as muscles, tendons, and ligaments. This can occur due to the trauma of the injury, as well as from the pressure and movement of the broken bone on the surrounding tissue. In some cases, the tissue damage can also cause bleeding, which can lead to bruising and discoloration. [26]

-Blood vessel damage: bones and joints trauma can also damage blood vessels, leading to bleeding and loss of blood flow to the affected area. This can cause the limb to become pale, cold and swollen.

-Swelling: Swelling around the area of the fracture is also common. This can occur due to inflammation and bleeding within the surrounding tissue. The swelling can also cause pressure on surrounding nerves and blood vessels, which can contribute to the pain and discomfort.

-Limited range of motion: The fracture may limit the range of motion of the affected limb or joint. The broken bone can cause pain and discomfort when moved, and the surrounding tissue can become swollen and stiff. This can make it difficult to move or use the affected area. [26]

-Nonunion / Delayed union: it occurs when the bone does not heal properly or when the bone takes longer than expected to heal. This can be due to poor blood flow to the fracture site, infection, or other factors. It can cause chronic pain, limited range of motion, and a visible deformity in the affected area.

-Malunion: Malunion is when the bone heals in an abnormal position. This can also cause chronic pain, limited range of motion, and a visible deformity in the affected area.

-Deformity: Depending on the location of the fracture, it may cause a visible deformity in the affected area. This can be caused by the broken bone shifting out of place, or by the surrounding tissue and muscles contracting or relaxing in response to the injury.

-Compartment syndrome: Compartment syndrome is a medical emergency that occurs when increased pressure within a muscle compartment reduces blood flow to the area. It can occur in the muscles surrounding a fracture and it can cause muscle and nerve damage if not treated promptly. Symptoms can include severe pain, weakness, and numbness in the affected area. [27]

-Infection: Open fractures are at risk of infection. This can lead to severe complications if not treated promptly. Infection can cause fever, redness, warmth, and tenderness at the site of the fracture, as well as delayed healing and possible spread of the infection to other parts of the body. [26]



Chapter two: Trauma aftermath



Severe traumatic brain injuries represent a "silent epidemic", because it is little known and therefore less well taken into account. Yet they remain the leading cause of death and disability in young adults. [28]

The factors for recovering after severe TBIs, and their reinstatement into society, have so far suffered from the shortcomings of clinical research. [28]

Patients with severe or even moderate TBI are hospitalized in intensive care units. In fact, the acute aggression phase lasts a few days or weeks after the trauma and requires constant monitoring and treatment by a team of ICU specialists. The objective of this stay will be to maintain optimal cerebral oxygenation and to treat any complications that may arise.

This care applies to respect national and international recommendations which are regularly updated to help medical teams all around the world to standardize their practices. That said, many factors will influence the neurological outcome of the patient after a severe TBI, the ER care conditions, his neurological severity, age, medical history, presence of other injuries... [31]

The human and material resources made available to the resuscitation team, the team's experience, the quality of the multidisciplinary work between emergency physicians, resuscitators, neurosurgeons and radiologists are also factors that come into play.

After resuscitation and initial rehabilitation, the body's autonomy is generally regained within a year and gives hope to the patient and his family.

On the other hand, the mental consequences of severe TBIs are more difficult to recover. The recovery of cognitive functions (memory, attention, reasoning) very generally incomplete, extends, on average, over two years. Mood and behavioral disorders constitute, in the long term, the major factor of disability. [29]

This shows that addressing the issue of TBI recovery requires a new semiology. In fact, this should not be limited to the medical field alone, but should also take into account the psychological and social aspects, whose impact on recovery increases as one moves away from the date of the accident. This semiology must be guided by the patient's individual needs and his home environment. [30]

Recovery, contemporaneous with the rehabilitation period, is largely made up of spontaneous improvements. At this stage, the injured person is still in the "hospital cocoon", and by leaving the rehabilitation center, recovery is faced with a primordial challenge: the continuity of care. [30]

I-Psychological processing:

Beyond the physical dimension that includes the medical treatment of the acquired injuries and the pain that comes with it, the psychological dimension can be immense and should not be neglected. [35]

The psychological reaction obviously varies from one individual to another, and can range from over-dramatization to feigned casualness.

Trauma injuries often come with psychological stress. People who are mentally well-equipped can handle this stress, but their reactions can be influenced by factors such as the type of injury, the way it happened, the specific body parts affected, and the individual's current life situation. [35]

Trauma is often synonymous with immobilization, bed rest, stopping the normal daily life and rethinking the planning. When the patient has to stop the stream of his life for a couple of months or more in some cases, it's hard to digest for a young active adult. For an older one too, even if experience often makes it possible to approach the situation more calmly. Be that as it may, what structured daily life is suddenly destroyed and the patient find himself in a state of shock and unable to think clearly

while feeling the need to reorganize. Therefore, trauma represents a major psychological shock, generally linked to a life or death situation, physical injuries, sexual violence, or related to the risk of such injuries.

Researchers and theorists have put multiple theoretical paradigms in place to better understand the psychological aspects of trauma and how people live through their traumatic experiences.

The suddenness and unexpected nature of traumatic incidents, ambulance rides, hospital admittance, surgical procedures, and transfer to an ICU can be overwhelming and terrifying for patients, particularly because their ability to understand and adjust to the situation has been greatly diminished. [36]

The psychological stress of experiencing trauma can stem from a fear of losing bodily function or death, as well as feelings of guilt related to the events leading up to the trauma [35]. In some cases, pre-existing mental health issues may also play a role. Trauma patients may also experience a range of psychological or behavioral symptoms as a result of damage to the central nervous system, underlying medical conditions, metabolic imbalances, and medication [37]. Financial concerns for both the victim and their loved ones, particularly if the victim is the primary breadwinner, can also contribute to psychological distress. Traumatized individuals may also be in shock, unconscious, or near death, and during this period, they may have vivid dreams or fantasies, such as feeling held captive [38]. Some may even go through a death-like experience.

People tend to manage their internal and external anxieties through a coordinated system of defenses [38]. Trauma patients also utilize various types of defense mechanisms for coping purposes [39].

The immediate psychological reactions to trauma fight the intrusion of an intolerable reality, while merging all together to protect oneself from harm:

1-Conservation withdrawal:

A conservation withdrawal reaction is a psychological condition characterized by minimized interaction with the surrounding environment, lower levels of function and energy, and immobilization [47,48].

It is the initial phase of withdrawal during the acute phase of an injury, more probably occurring in severe cases of trauma where a body part has been lost or in life-threatening situations [49].

Individuals experiencing this reaction tend to be less interested in their loved ones, other injured patients, and external events. They tend to withdraw from their surroundings, communicate less, and spend a lot of time sleeping, primarily responding to issues related to comfort and pain. [42]

2-Denial:

Denial can be a coping mechanism that patients use to alleviate anxiety related to a traumatic event or loss. It can be used to cope with the immediate aftermath of a traumatic event, as a way to protect oneself from the overwhelming emotional impact of the trauma. It can involve refusing to acknowledge or accept the reality of the trauma, minimizing the events that happened and their impact, or rationalizing the traumatic event as something less severe. However, it is only observable when communication with the patient is possible [42]. In its strict sense, it represents an exceptional reaction given that the patient tends to repress the perception of a painful reality, such as acquiring severe physical injuries, witnessing or being responsible of a death, and replacing it with a pseudo-less painful-reality [41]. Denial is described as multiple cognitive maneuvers that are based on reality revocation, such as literally blocking out, pulling out from, or misinterpreting internal and/or outward experiences.

Controversially, it is considered a simple defense mechanism acquired by simply negating a thought, emotion, or sense as in it didn't occur.

The essence of this mechanism is manipulating or not grasping reality, which is believed to have been developmentally embedded to the origins of self-protective reflexes, such as children's ability to close their eyes to cut off stimulation from the outside environment.

In some cases, patients may not be aware of or acknowledge the severity of an injury or loss, such as a limb or function. This can be problematic, as it may lead to patients refusing necessary medical treatment or leaving the hospital prematurely [40]. Research suggests that individuals who avoid confronting their loss may have more difficulty adjusting in comparison to those who confront it directly [40].

When denial persists over time and becomes maladaptive, it can prevent individuals from processing their traumatic experiences and seeking appropriate help, and it can impede the ability to move on and recover. Sooner or later, the repression tends to wear off when the trauma event resurges and persists until it is confronted in the proper psychological manner.

3-Denegation:

When reality becomes so difficult to bear, the subject has a tendency to doubt and not accept it. One can thus, at the announcement of bad news, think that it is not possible, that there must be a mistake, that some facts contradict it [41].

Denegation refers to the act of doubting and minimizing the reality of a situation, event, or emotion. It is a coping strategy that can be used to avoid facing difficult or painful emotions or realities [43].

Denegation and denial are related but distinct psychological processes. One is to be distinguished from the other. Denial, on the other hand, refers more broadly to the refusal to acknowledge or accept the reality of a situation, event, or emotion. If, in denegation, the subject denies an image as belonging to him, denial is a total refusal of a perception of an exterior fact, experienced as dangerous and intolerable [44].

It's concluded that if denial leads to asserting an impossible fact, denegation entails to deny a possible fact. The confusion between both terms is partly due to the Freudian Theory evolution, and to translation subtleties from German to other languages [43].

Generally, if a predominance link is often made between denegation and neurosis, and between denial and psychosis, it needs to be certified in the sense where denial and denegation can coexist in the same person [43].

4-Dissociation:

It refers to the meaningless experience of “it is just a nightmare. I will wake up and carry on with my normal and real life”. The patient feels like a stranger to the painful situation, like an unconcerned, distant spectator. [41]

Generally, dissociation symbolizes a disunion of cognitive elements, such as emotions, thoughts and behaviors, usually well embedded and unified by the subject. He can experience different forms of dissociative symptoms: a distortion of time and space perception (a blur impression, being in a movie – like feeling), disorientation (loss of time and space markers), feeling like it is not really him who is present in the intolerable and painful situation – depersonalization – feeling like the world is not real and oneself has become strange and unfamiliar – derealization –. [45]

We can also witness uncontrolled motor behaviors by the subject, disingenuousness feelings, even transient consciousness impairment. [45]

5-Amnesia:

If we witness, in denial the subject can suppress the perception of a painful reality, in denegation he can deny its meaning, and in dissociation he can distance himself from it, the subject can also conceal its trace. [41]

The intolerable memory is erased or at least unavailable to be processed.

It is considered a retrograde amnesia, as in the inability to remember events that happened prior to the traumatic experience, while preserving the ability to encode brand new memories.

Often, the lost memories contain details about the upsetting and traumatic experience. However, even though the information is concealed, it continues to affect the patient's behavior. [46]

It can persist for a significant period of time, needing memory retrieval techniques to break through the barriers and conflicts that led to their amnesia, while others seem to regain their missing memories spontaneously. [46]

6-Consciousness impairment:

Physically fainting is the typical escapement method by loss of consciousness. It can be explained by the simple logic of "once fainted, one can no longer suffer". [41]

There are other forms of impaired consciousness, such as an immediate reaction to a critical and vital situation, or a chronic decrease of the consciousness acuity due to psychotropic drugs abuse. [41]

7-Anger:

Anger is a common reaction frequently witnessed in trauma patients. [41]

Trauma survivors may experience intense feelings of anger, either directed towards themselves, other people, or towards a higher power.

This anger can be a normal response to the unfairness of the traumatic event, and can be a way to cope with post-traumatic feelings of vulnerability and helplessness. On a psychological level, it is often a response to perceived wrongs and is directed towards rectifying them [50]. In trauma patients, anger often results from loss or the fear of loss, and resulting grief response.

Additionally, a loss of control over one's own body and being dependent on others can also be a significant cause of anger. Other contributing factors may include physical pain, psychiatric conditions, brain injuries, substance use, and the side effects of medication.

The traumatic event is experienced as an unjust incident that causes hostile behaviors and anger, which very often are not employed rationally. That is why it is safer to let individuals express thoughts and feelings that are going through their bodies until their emotions wear out, without seeking to validate their arguments. [41,42]

8-Regression:

Regression can be defined as a return to a previous stage of development. This can manifest in patients who exhibit a high degree of dependency, even when they possess the ability to perform tasks independently. They may also experience feelings of guilt related to this childlike behavior. [42]

9-Guilt or shame:

Trauma survivors may blame themselves for the traumatic event, or feel guilty or ashamed about their reactions or behaviors during or after the event and their helplessness and dependency during their recovery [38].

These feelings can be a normal part of the healing process, but when they persist and become overwhelming, they can impede recovery and lead to further problems such as depression and anxiety. Guilt and shame can also cause a person to avoid seeking help, and can fuel a self-perpetuating cycle of negative thoughts and emotions.

10-Anxiety and depression:

Anxiety can develop as a result of an individual perceiving a traumatic injury as a significant threat, evoking fears and insecurities from early childhood [51,52]. After

trauma, individuals do not see themselves as being fully whole and intact, which leads to the lack of independency and self-sufficient feelings. In the hospital, patients have to rely on many caregivers, who are complete strangers for them. This dependence can lead to feelings of stranger anxiety. They are also concerned about deformities and losing the love and respect of loved ones. Similarly, depression may stem from the loss or potential loss of physical abilities, as well as changes in familial and professional roles. In severe cases, this can lead to a decrease in self-worth and usefulness to loved ones and society [53].

11-Grief:

Trauma patients may go through a prolonged and intense process of grief. This process is a natural way of coping with loss and readjusting one's inner self [54]. It typically involves five stages: denial, bargaining, anger, depression, and acceptance [55]. However, not everyone may experience all of these stages.

12-Transition and protection:

It marks the period when the patient begins to effectively cope with the trauma and its related repercussions. This process can start a few weeks after the experience, sometimes even months later.

It takes into account the subject's reintegration process and especially his need to give a meaning to his traumatic experience, which is often considered an essential component to therapy [56].

During this phase, the patient may experience a need for assistance and support, either from members of his social network or from specialists.

This support is likely necessary to help him better manage his stress, and to facilitate his attempt to overcome the incident.

This phase may also contain dysfunctional or non-adaptive coping mechanisms, such as alcohol and drug abuse, disintegration within his social network and personal isolation [57].

Therefore, therapeutic interventions have been designed to reinforce the positive coping mechanisms and prevent or manage the non-adaptive ones.

13-Resolution:

This phase marks the reintegration of the individual with a sense of stability while functioning in daily life. In the best case scenario, it can occur after a couple of months; in the worst case scenario, it takes multiple months or even years after the traumatic experience. This stage includes the return to daily activities and normal interactions with the outside world. Most people will experience either denial or acceptance feelings towards their incident. [57]

As a general rule, patients have to convince themselves that they are safe in their respective environment, and assume their new role of “survivor” [57], depending on the severity of the trauma and their personality traits before the incident. However, this resolution does not bear meaning to a return to the prior-to-the-trauma-state, because they must incorporate this experience into their understanding of their personality and environment.

Finally, this demonstrates not only that trauma repercussions are lasting, but also that people can achieve improved functioning long after the intolerable traumatic experience. [57]

II-Care-related issues:

Trauma patients face a wide range of care-related issues that arise from the initial injury and the first intervention by paramedics, through the pre-hospital phase and hospitalization, and continuing through recovery and rehabilitation. These issues concern serious physical injuries, such as broken bones, brain injuries, internal bleeding, and spinal cord injuries, which require immediate medical attention and surgery. Once stabilized, trauma patients may require close monitoring and support in the intensive care unit, where they may be at risk for complications such as infection and blood clots. Emotional and psychological issues such as anxiety, depression, and post-traumatic stress disorder are also common among trauma patients. They may have difficulty adjusting to changes in their physical abilities and require rehabilitation and physical therapy to regain their strength and mobility [60]. Trauma patients may also face financial challenges related to medical expenses and lost income and they may have a higher risk for developing chronic health conditions.

1-First intervention:

The first intervention by paramedics for trauma patients typically includes a range of interventions aimed at stabilizing the patient's condition and preparing them for transport to the hospital.

If it is not done properly or is delayed, it can have a significant impact on the patient's outcome. Delays in providing appropriate care can lead to further injury and deterioration of the patient's condition [58].

The specific interventions will depend on the nature and severity of the injuries, but they may include some of the following:

-Airway management: Paramedics will assess the patient's airway and ensure that it is open and clear. They may need to use techniques such as suctioning, intubation, or a tracheotomy to maintain an open airway.

Proper airway management is critical in ensuring that the patient is able to breathe properly. If the airway is not properly managed, the patient may not be able to breathe properly and may suffer from hypoxia which can lead to cognitive impairment, brain damage or even death. [58]

-Breathing support: Paramedics will assess the patient's breathing and provide oxygen as needed. They may also use mechanical ventilation.

Proper breathing support is critical in ensuring that the patient is getting enough oxygen to their body's tissues. If the patient is not receiving appropriate breathing support, they may not be getting enough oxygen to their body's tissues. This can lead to hypoxia and organ damage.

-Cardiac monitoring and support: Paramedics will monitor the patient's heart rate and rhythm and provide cardiac support as needed. This may include administering medications to regulate the heart rate or performing cardiopulmonary resuscitation (CPR) if the patient's heart has stopped. If the patient's heart is not properly monitored, they may not receive appropriate care for cardiac problems such as a heart attack or cardiac arrest. This can lead to further cardiac damage or death. [58]

-Hemorrhage control: Proper hemorrhage control is critical in preventing the patient from going into shock or bleeding to death. Paramedics will assess the patient for bleeding and provide appropriate care to control hemorrhage. They may use techniques such as direct pressure, tourniquets, or hemostatic agents to control bleeding. [59]

-Splinting and immobilization: If fractures and dislocations are not properly immobilized, the patient may suffer unnecessary additional pain and even further injury during transport, which can especially alter the chances for a good recovery outcome.

-Pain management: Proper pain management is critical in ensuring that the patient stays comfortable during transport. If trauma patients are not properly managed for pain, they may experience unnecessary suffering during transport.

-Transport: Proper and timely transport is primordial in ensuring that the patient arrives at the appropriate hospital for specialized care as soon as possible. Delays in transport can lead to further deterioration of the patient's condition and can also delay the patient's arrival at the appropriate hospital for specialized care. Once the patient is stabilized, they will be transported to the nearest appropriate hospital for further care.
[60]

If a trauma patient does not receive a proper first medical intervention, it can have severe psychological and physical consequences. A delay in providing medical attention can lead to an exacerbation of the patient's condition and can even result in death.

A neglectful attitude towards the patient, such as a delayed time of arrival of paramedics and failing to properly assess their condition and provide appropriate care, can also cause psychological harm, as the patient may feel abandoned or neglected. The patient may also feel a sense of injustice, angry and resentful towards the medical professionals, and may have difficulty trusting medical professionals in the future.

Family members and friends may feel guilty for not being able to help the patient, or may blame themselves for the patient's condition. This can lead to feelings of helplessness and a sense of loss.

These psychological harms may take time to manifest, and that some people might not show any visible symptoms but still be affected by the experience. Additionally, it may be compounded by the physical harm caused by the trauma itself.
[58, 60]

It's important to note that proper medical intervention to trauma victims can not only save lives but also prevent long-term psychological damage to the patient and their loved ones.

2-Admission:

Admission refers to the process of receiving and providing care to a patient who has sustained injuries from an accident, violence, or other traumatic events. The trauma patient is brought to the hospital and assessed by a team of healthcare professionals to identify and treat any life-threatening injuries. It entails several steps, including [61]:

-Initial assessment and stabilization: Upon arrival at the hospital, the patient will undergo a primary survey to identify any life-threatening injuries that require immediate attention. This includes assessment of the patient's airway, breathing, circulation, disability, and exposure. The patient will also be stabilized to prevent further injury or deterioration. This may include immobilizing suspected fractures, stopping any bleeding, providing oxygen, and administering medications as needed. [61]

If life-threatening injuries are not identified and treated immediately, it can lead to severe deterioration, permanent disability, or death.

This can also lead to psychological distress, such as post-traumatic stress disorder or survivor's guilt, in the patient or their loved ones.

-Diagnostic imaging: Trauma patients will typically undergo diagnostic imaging such as X-ray, CT scan or MRI to evaluate the extent of injuries. These images can help identify fractures, internal bleeding, organ damage, and other injuries that may not be visible during the initial examination.

Delayed imaging or misdiagnosis can lead to improper treatment and poor patient outcomes. This can result in the progression of the injury, and lead to further deterioration of the patient's condition, increased pain and suffering, and poor quality of life. [61]

-Coordination with specialists: Trauma patients may require care from multiple specialists, such as orthopedic surgeons, neurologists, and rehabilitation specialists. A team of healthcare professionals will work together to coordinate the patient's care, ensuring that all necessary interventions are provided in a timely and efficient manner.

Poor coordination can lead to delays in treatment, duplication of services, and poor patient outcomes. This can also lead to increased risk of complications, prolonged hospital stays and recovery time, and increased healthcare costs.

It is crucial for healthcare professionals to ensure that trauma patients receive timely and appropriate care to minimize the risk of these issues and improve patient outcomes.

3-Intensive Care Unit:

The intensive care unit (ICU) is a specialized area of the hospital that provides close monitoring and management of critically ill patients.

For trauma patients, the ICU represents a higher level of care and monitoring than a regular hospital room. This is because trauma patients often have multiple and severe injuries that require close monitoring and management. It includes various steps, such as [62]:

-Close monitoring: In the ICU, trauma patients will have continuous monitoring of vital signs such as heart rate, blood pressure, and oxygen levels. The patient will also be assessed for signs of infection, bleeding, or other complications. This allows the healthcare team to quickly identify any complication that may arise and take any necessary interventions to address them. These issues may include equipment malfunctions, missed vital sign changes, and misinterpretation of monitoring data, which can lead to delays in treatment and even death. [62]

-Advanced life support: Trauma patients in the ICU may require advanced life support, such as mechanical ventilation, to support their breathing. They may also require other interventions such as blood transfusions, dialysis, or extracorporeal membrane oxygenation (ECMO) to support their circulation and oxygenation.

Issues that may arise include equipment malfunctions, complications related to the use of advanced life support, such as bleeding, infection, and organ dysfunction, and psychological distress related to being on life support or being a witness to neighboring patients in the ICU. [62]

-Multidisciplinary approach: The ICU team typically includes critical care physicians, nurses, and other specialists, such as respiratory therapists, physical therapists, and occupational therapists, who work together to provide the highest level of care for the patient. This coordinated approach ensures that all aspects of the patient's care are managed effectively.

Issues that may be faced include communication breakdowns among the healthcare team, lack of coordination, and disagreements about the patient's care, which can lead to delays in treatment and poor patient outcomes.

-Pain management: Trauma patients in the ICU may experience severe pain due to their injuries and may require specialized pain management techniques. The ICU team will work to control the patient's pain and prevent complications such as undertreatment or overtreatment of pain, anxiety and depression that can arise from untreated pain, which can lead to increased pain, prolonged recovery time, and increased risk of complications.

-Family support: Trauma patients in the ICU, along with their families may require emotional and psychological support. The ICU team will work with the patient's family to provide support and information throughout the patient's stay in the ICU.

Poor communication and lack of support and resources for the patient's family can aggravate the emotional and psychological distress, paving way for poor patient physical and psychological outcomes. [63]

Being in the ICU can be a traumatic and stressful experience for both the individual and their loved ones. The individual may feel anxious and depressed about their condition and the uncertainty of their recovery. They may also feel isolated, as they may be unable to communicate or interact with others due to their injuries and the nature of the life support equipment. They may also feel hopeless and helpless, as they are dependent on the machine for survival. [63]

The individual may also experience a sense of loss of control over their body and their life. They may be unable to move or communicate, and may feel disconnected from their body. This can cause feelings of frustration and helplessness.

Family members and loved ones may also experience a range of emotional reactions. They may feel guilt for not being able to do more to help, anger at the situation, and grief over the potential loss of their loved one. They may also feel overwhelmed by the responsibility of making decisions about the individual's care. [63]

4-Surgery:

Surgery can represent a variety of things to trauma patients, depending on the individual and their specific situation. In general, surgery may be seen as a necessary step in the healing process for physical injuries sustained in a traumatic event. However, it can also be a source of anxiety and fear for patients, as it is often associated with pain and recovery time [66]. Additionally, some patients may view it as a final resort or last hope for survival. Surgery can encompass a wide range of procedures, depending on the type of trauma and the specific injuries sustained. Some common types of surgery for trauma patients include: Orthopedic surgery (to repair

broken bones or fractures), Soft tissue surgery (to repair injuries to muscles, tendons, and ligaments), Vascular surgery (to repair injuries to blood vessels), Neurological surgery (to repair spinal cord or traumatic brain injuries), Thoracic surgery (to repair injuries to the chest or lungs), Abdominal surgery (to repair injuries to the abdomen or internal organs).

The specific surgical procedure will depend on the injury, the extent of the damage, and the patient's overall health. Surgery typically involves making incisions in the skin to access the affected area, and then repairing or removing damaged tissue. In some cases, the surgery may also involve the use of pins, plates, screws, to hold bones or other structures in place during healing. In general, the surgery will be done under general or regional anesthesia.

There are several surgery-related issues that may arise, including [64,65]:

-Pain: Surgery can be a painful experience, and patients may experience pain and discomfort during the recovery process. The severity of pain will depend on the type of surgery and the patient.

Pain management techniques, such as medications and physical therapy, may be used to help control pain. [65]

-Adverse reactions to anesthesia: Some patients may have an adverse reaction to the anesthesia used during surgery, such as nausea or allergic reactions. In rare cases, patients may experience more serious complications such as respiratory failure or cardiac arrest. [64]

-Bleeding: Some patients may experience bleeding during or after surgery, which can lead to complications such as blood transfusions, re-operation or even death. The blood loss amount depends on the type of surgery and the patient.

-Scarring: Surgery leaves scars, which can be unsightly or uncomfortable. In some cases, additional surgery may be required to remove or reduce scarring.

-Nerve or tissue damage: It can occur when a nerve or tissue is accidentally damaged or injured during the surgical procedure. Its risk will depend on the type of surgery and the specific area of the body being operated on. Nerve damage can result in temporary or permanent loss of sensation, movement, or function. In some cases, it can also result in chronic pain or phantom pain.

Tissue damage can result in the loss of function or mobility of the affected area. This can happen when the tissue is damaged by the surgical incision or when the tissue is damaged during the healing process. [64]

Surgery is a stressful experience for the patient, and can have a significant psychological impact, both in the short-term and long-term. It may lead to emotional or psychological issues such as fear, anxiety, depression or PTSD. These issues may be triggered by the pain, discomfort, or uncertainty caused by the surgery or the injury, or by the fear of potential complications.

Trauma patients may also have difficulty adjusting to the physical changes caused by their injuries and the surgery itself. Additionally, patients who have undergone surgery for a traumatic injury may also experience phantom pain, which can further affect their psychological well-being. [66]

After the surgery, the patient will typically be taken to the recovery room to be monitored for any complications, and then moved to a hospital room for further recovery and rehabilitation. The recovery time and rehabilitation process can vary depending on the specific surgery and the individual, but it may take several weeks or months for the patient to fully recover.

5-Post-surgery:

Post-surgery refers to the period of time following a surgical procedure. This can include the immediate recovery period in the hospital as well as the longer-term recovery period at home or in a rehabilitation facility. During this time, the patient

may be in a great deal of pain and discomfort, and may be sedated or unconscious for a period of time. They will be closely monitored by medical staff to ensure that they are stable and that there are no complications arising from the surgery.

As the patient begins to wake up and become more alert, they may begin to feel the full extent of their injuries and the physical changes caused by surgery. This can be a difficult and emotional time, as they may be struggling with pain, discomfort, and anxiety. They may also be disoriented and confused due to the anesthesia and sedation they received during surgery.

They will also receive physical therapy and other treatments to aid in the healing process and help them regain function.

There are several issues that may arise during the post-surgery period for trauma patients, including [64,65]:

-Pain and discomfort: Surgery is a major procedure that can cause a significant amount of pain and discomfort. Patients may experience pain at the surgical site, as well as in surrounding areas due to the manipulation of tissue during the surgery. They may also experience discomfort from the incision, the presence of drains or other surgical equipment, and from the physical therapy exercises they are required to do during recovery.

-Infection: Any surgical procedure carries a risk of infection. To minimize this risk, surgeons use sterile techniques during surgery and give antibiotics to prevent infection. However, even with these precautions, some patients may develop an infection at the surgical site or in other parts of the body. Patients will be closely monitored for signs of infection and given appropriate treatment if an infection is detected.

-Bleeding and blood clots: Surgery also increases the risk of bleeding and blood clots, which can be life-threatening if not promptly treated. Patients will be closely

monitored for signs of bleeding, such as blood in the urine, stool or vomit, and given appropriate treatment if a bleed is detected. Blood clots can form in the legs or lungs; patients will also be monitored for signs of DVT (deep vein thrombosis) or PE (pulmonary embolism).

-Delayed healing: Depending on the extent of the injury, the patient may experience delayed healing, which can prolong the recovery period. Delayed healing can be caused by a number of factors, including poor blood flow to the surgical site, infection, or poor nutrition.

-Adverse reactions to medication: Patients may have adverse reactions to the medications prescribed to manage pain and other symptoms, such as nausea, dizziness, or allergic reactions. They may also experience side effects from antibiotics or other medications used to prevent or treat infections.

-Mental health issues: Patients may experience a range of emotional and psychological challenges as they adjust to the changes caused by their injuries and the surgery. They may experience fear, anxiety, depression, and post-traumatic stress disorder (PTSD) as well as feelings of hopelessness and helplessness. [66]

-Phantom pain: Patients who have undergone surgery for trauma may experience phantom pain, which is pain that is felt in a body part that has been amputated or is no longer functioning. This type of pain can be caused by nerve damage and can be difficult to manage.

-Difficulty in regaining function: Depending on the nature and extent of the injury, patients may have difficulty regaining function in the affected body part or limbs. This can be due to nerve damage, muscle or tissue damage, or other factors. It can be frustrating and disheartening for patients, especially if they were active or had a certain profession prior to the injury.

It's important for medical staff to closely monitor patients for these issues and provide appropriate treatment and support to help the patient recover as quickly and safely as possible. This may include medication management, physical therapy, psychological support, and other interventions.

After the initial recovery period in the hospital, the patient will typically be discharged and sent home or to a rehabilitation facility. During this time, the patient will continue to receive physical therapy and other treatments to aid in the healing process and help them regain function. Depending on the extent of the injury, the patient may need to use crutches, a wheelchair, or other assistive devices. They may also be prescribed medications to manage pain and other symptoms. [64,65,66]

III-Pain:

In addition to the well-acknowledged repercussions of traumatic brain injuries, including motor, cognitive and sensory deficits, accruing evidence implies that pain is common as well after TBI. [68]

Acute pain, ordinarily related to defined tissue damage, usually lasts as long as several weeks and is predicted to lessen when healing has taken place.

Chronic pain, while having no sole description, is more steady and carries on for three to six months or more. [68]

Even though long-term studies of TBI pain have showed that some resolution of pain can happen in the first four years post-TBI, it is not perspicuous what determinants support continuance vs resolution of post-TBI pain [67].

Traumatic brain injuries can vary upon their contingency on the degree of correlated physical, cognitive and psychiatric repercussions.

Studies of the relationship between the severity of traumatic brain injuries and the possibility of suffering chronic pain have shown surprising results. It was presumed that mild TBIs have a bigger chance to be associated with chronic pain in comparison with moderate to severe TBIs. [68]

However, an assessment of a lower level of pain in severe trauma victims may be due to challenges in evaluating their pain on account of impaired cognitive abilities and consciousness. [68]

1-Psychological impact:

Pain is a complex phenomenon that can have a significant additional psychological impact on trauma patients. The experience of pain is influenced by a variety of factors, including the severity of the injury or condition, the individual's previous experiences with pain, and their coping mechanisms. [69]

Progressively, pain can cause a range of emotional reactions, such as anxiety, depression, anger, fear, fatigue, insomnia, loss of sexual desire.... These responses can exacerbate the experience of pain and make it more difficult for an individual to manage. Chronic pain, in particular, can have a significant impact on an individual's quality of life, as it can interfere with daily activities and make it difficult for them to maintain relationships and participate in social activities. [68]

Pain can also lead to cognitive changes, such as difficulty concentrating and memory problems. These cognitive changes can make it difficult for an individual to perform their daily activities and can lead to feelings of frustration and helplessness.

Over time, these reactions develop factors of pain exacerbation and prolongation, then the patient finds himself in a vicious circle.

1-1-Attention – Distraction process:

Research has indicated that pain increases when the subject's attention is solely focused on his pain. Conversely, when he is distracted the pain then appears reduced. It resurges again when attention regains its normal state.

The resumption of daily professional or leisure activities is a fundamental treatment step, which must be done gradually by a rhythmic manner adapted to each person. [69]

1-2-Affective component:

If pain holds a special place among other perceptions, it is due to the affective component that gives it its agonizing tone.

This component is a structural part of the pain experience and can extend to more differentiated states such as anxiety and depression.

It is mainly determined by the nociceptive stimulus itself and the context in which the stimulus is applied (the meaning behind the trauma-related acquired injuries, uncertainty about recovery). [69]

1-3-Cognitive component:

It refers to the cognitive procedures that influence pain perception and the reactions it determines: attention and distraction processes, pain interpretation and significance, anticipation, references to past personal painful experiences, the behavior to adopt. [69]

1-4-Behavioral component:

It includes all verbal and non-verbal expressions noticeable in the person who is suffering (complaints, moaning, mimicry, analgesic posture...).

These expressions ensure a communication function with the entourage, and they depend on the family environment, culture, social standards related to age and gender. [69]

2-Pain assessment tools:

2-1-Conscious and responsive patients:

Objective techniques such as pain-related reactions, have proved at times, their efficiency in identifying pain and its intensity. However, the standard technique for pain evaluation remains self-report. [71]

The most frequently used pain evaluation tools in conscious and responsive patients are the Visual Analog Scales, the Verbal Rating Scales and the Numerical Rating scales [70].

All of these scales represent psychometric response scales that are applied to measure subjective characteristics such as pain. Patients specify the intensity of their discomfort by indicating a spot along a visualized line between two end spots, representing the minimum and the maximum imaginable intensities. The indicators along the line can be either a visual, verbal or numerical representation.

The VAS and NRS are both functioning sensitively to the subjective feeling of the magnitude of pain. [72]

Studies have shown that the VRS was favored by the elderly and the uneducated population, while the NRS was the preferred tool in people suffering chronic pain and in an age-varied population. [73]

Regardless of the scale used, the magnitude of pain is best rated at rest and throughout an activity [72].

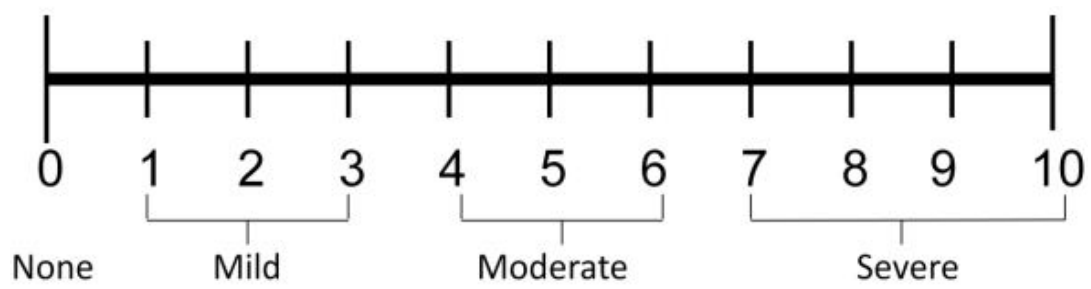


Figure 7: Numerical rating scale

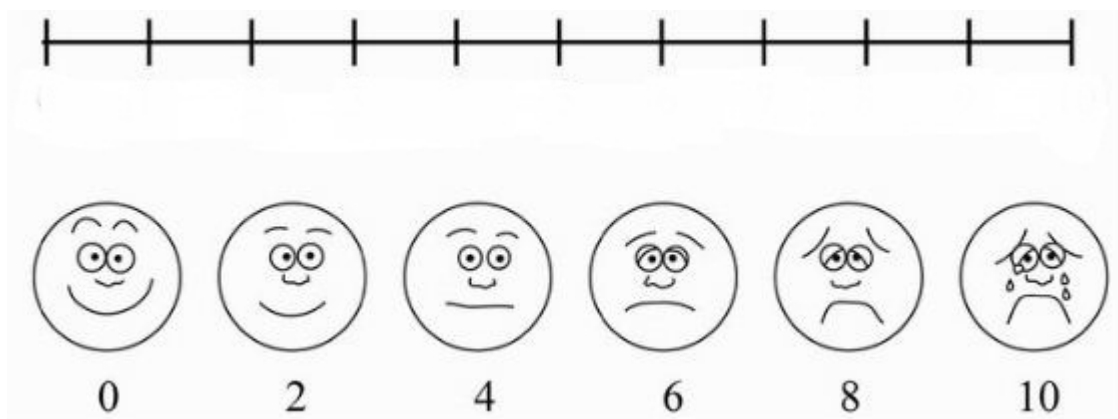


Figure 8: Visual analog scale



Figure 9: Verbal rating scale

2-2-Unconscious or unresponsive patients:

Pain assessment in subjects incapable to self-report requires a hierarchy of methods starting with an attempt to get self-report, then an examination to search for what causes pain, and collecting reports of pain behavior changes from caregivers and family members. [74]

Four pain evaluation tools have been explored for use regarding unconscious or sedated patients [75]. The Critical Care Pain Observation tool and the Behavioral Pain Scale are both sensitive and functioning with a superior reliability compared to the other tools, including the Pain Assessment and Intervention Notation Algorithm and the Non-Verbal Pain Assessment tool, ones include physiological indicators while others use behavioral indicators.

Nevertheless, behavioral pain tools bear so much difference with a self-reported pain intensity tool as it can only designate the presence of pain without addressing the reactivity to pain relief. [75]

Item	Description	Score
Facial expression	Relaxed	1
	Partially tightened (e.g., brow lowering)	2
	Fully tightened (e.g., eyelid closing)	3
	Grimacing	4
Upper limb	No movement	1
	Partially bent	2
	Fully bent with finger flexion	3
	Permanently retracted	4
Compliance with ventilation	Tolerating movement	1
	Coughing but tolerating ventilation most of the time	2
	Fighting ventilator	3
	Unable to control ventilation	4

Figure 10: Behavioral pain scale

Indicator	Description	Score	
Facial expression	No muscular tension observed	Relaxed, neutral	0
	Presence of frowning, brow lowering, orbit tightening, and levator contraction	Tense	1
	All of the above facial movements plus eyelid tightly closed	Grimacing	2
Body movements	Does not move at all (does not necessarily mean absence of pain)	Absence of movements	0
	Slow, cautious movements, touching or rubbing the pain site, seeking attention through movements	Protection	1
	Pulling tube, attempting to sit up, moving limbs/ thrashing, not following commands, striking at staff, trying to climb out of bed	Restlessness	2
Muscle tension Evaluation by passive flexion and extension of upper extremities	No resistance to passive movements	Relaxed	0
	Resistance to passive movements	Tense, rigid	1
	Strong resistance to passive movements, inability to complete them	Very tense or rigid	2
Compliance with the ventilator (intubated patients)	Alarms not activated, easy ventilation	Tolerating ventilator or movement	0
	Alarms stop spontaneously	Coughing but tolerating	1
	Asynchrony: blocking ventilation, alarms frequently activated	Fighting ventilator	2
OR			
Vocalization (extubated patients)	Talking in normal tone or no sound	Talking in normal tone or no sound	0
	Sighing, moaning	Sighing, moaning	1
	Crying out, sobbing	Crying out, sobbing	2

Figure 11: Critical Care Pain Observation tool

3-Pain management:

Generally, medication forms the major component of the pain management approach, different drugs working on different parts of the nociceptive pathway [76]. These typical chronic pain interventions such as using opioids may not be effective in the long term and may also pose risks. There has been a debate regarding the effectiveness of using opioids for chronic pain conditions [77]. According to studies, prolonged use of opioid medication can have a negative impact on mental health and increase the need for healthcare services. Additionally, these drugs have a high risk for abuse [78] and ultimately a substance use disorder. While they may be useful in the short-term, the benefits of opioids decrease over time [79] and prolonged use may even lead to opioid-induced hyperalgesia [80].

Clearly, there is a pressing need for a different method of managing chronic pain in order to enhance long-term results. The biopsychosocial model of pain and disability is now commonly acknowledged as the most effective way to comprehend and treat chronic pain conditions, replacing the outdated biomedical model [81]. This new method has opened up new possibilities for managing chronic pain, by expanding the range of treatment options available and leading to more effective clinical approaches. Pain is not a straightforward issue that can only be linked to nociception or pathology. It is a complex phenomenon that is influenced by various factors such as biological, psychological, and social factors. Emotions and cognition play a significant role in how pain is experienced. This can lead to a cycle of pain, distress, and disability. However, with the biopsychosocial model in mind, comprehensive interdisciplinary treatment programs have been developed to address the complexity of pain [76].

It is important to differentiate between multidisciplinary and interdisciplinary approaches in pain management. Despite being used interchangeably in literature, these terms have distinct meanings. Multidisciplinary care involves the participation of various health care professionals, such as physicians, psychologists, and therapists, but their integration and communication may be limited. On the other hand, interdisciplinary care is characterized by a more coordinated program with frequent communication among health care professionals working together “under one roof” in the same center [76].

Therefore, effective comprehensive treatment requires consistent communication among all members of the treatment team, and it's essential for team members to instill the treatment philosophy in their patients.

3-1-Pharmacological treatments:

Pharmacological approaches in pain management mainly refer to opioid analgesics, non-opioid analgesics, which include non-steroidal anti-inflammatory drugs such as ibuprofen and other medications like aspirin, adjuvant analgesics such as antidepressants and muscle relaxants, whose utilization is not typically used for pain relief, but may be added to a pain management regimen to improve overall effectiveness,

For centuries, the gold standard of care for treating significant pain have been opioids analgesics [77,78,79,80]. They are usually safe, when used within the allowed thresholds, but sometimes they can be responsible of various side effects such as respiratory depression, impaired cognitive abilities, sedation, sometimes even death. They can easily lead to a substance use disorder.

When these drugs are used for a prolonged period of time, the brain begins to adapt to their presence. This adaptation is thought to occur because the brain increases the number of opioid receptors in response to the drug, a process known as upregulation. The increased number of receptors means that more of the drug is needed to achieve the same pain-relieving and euphoric effects, leading to tolerance.

Prolonged use of opioids can also lead to changes in the brain that make it difficult to control drug use, leading to addiction. These changes occur primarily in the brain regions involved in reward and motivation, such as the prefrontal cortex, nucleus accumbens, and amygdala. Research has shown that chronic opioid use can disrupt the normal functioning of these brain regions, leading to the development of compulsive drug-seeking behavior [77,78,79,80]. The goal in opioid therapy is to optimize pain exemption while ensuring side effects and addiction prevention, that is why it is important to combine different types of medications, since combining drugs mean lower than usual dosages. For example, prescribing Paracetamol in regular dosage in addition to Morphine facilitate opioid usage in lower dosages, which ultimately reduces the opioid-related side effects.

3-2-Non-pharmacological treatments:

Multiple physical and psychological factors affect how people experience and perceive pain. They can be well illustrated within various types of therapeutic interventions targeted to reduce pain.

The Physical interventions can include:

-Acupuncture: it consists on the stimulation of specific points, located in different body parts, using several physical techniques. Its therapeutic effect is based on Traditional Chinese Medicine principles, which will relieve pain according to three axes, while respecting the specific information regarding its location and causes: unblocking, regularization, expulsion. [85]

-Transcutaneous Electrical Nerve Stimulation: it is a non-invasive technique used to relieve pain by employing a low voltage electrical current transmitted through electrodes placed on the skin. It can be explained by two hypotheses: the gate theory as in the controlled pain pathway and the endogenous production of natural analgesics. [86]

-Physiotherapy can involve a variety of techniques to help manage pain, including exercises to improve strength, flexibility, and range of motion, manual therapy to release tight muscles and joints, and modalities such as heat or cold therapy. Physiotherapists will also work with patients to develop a plan for self-management of pain and to prevent future pain or injury. Education about posture, body mechanics, and lifestyle factors that may contribute to pain can also be an important aspect of physiotherapy for pain management. [87]

The psychological interventions mainly refer to psychotherapy, which includes cognitive behavioral therapy [chapter IV] and functional restoration.

-Interdisciplinary treatment for chronic pain often includes the use of Cognitive Behavioral Therapy (CBT) as a key component. The goal of CBT is to help patients identify and replace negative thoughts, emotions, and behaviors with more positive ones in order to enhance the effectiveness of other treatments, such as physical therapy, and improve overall functioning through enhanced coping mechanisms. Within chronic pain management programs, CBT has become a popular psychosocial treatment choice. Studies have shown that CBT can lead to significant improvements in various aspects of chronic pain, such as coping and social functioning [82]. CBT addresses specific cognitive areas, such as catastrophizing, restraint from activity due to irrational concerns about harm and acceptance of the pain condition [83]. Other techniques used in CBT may include relaxation training, motivation and attention control, and activity management training.

-Functional restoration focuses on helping individuals with chronic pain to improve their functional abilities and quality of life [84]. This may include addressing physical, psychological, and social factors that contribute to the individual's condition, as well as providing education and training in pain management, physical therapy, and other techniques to improve function and reduce pain and disability. Functional restoration has repeatedly shown to be effective in treating chronic pain by utilizing a better comprehensive approach that includes diagnosis, intervention, and management [84]. This approach involves a team of interdisciplinary clinicians who work together to help patients regain their physical and psychosocial functioning. Effective communication among all members of the team is crucial in addressing the various physical, psychological and vocational challenges that patients may face during their recovery process. [84]

IV-Physical deformity:

A deformity is an abnormal shape or appearance of a body part, often caused by injury or disease. In the case of severe trauma, a deformity may occur in any part of the body and can be caused by a wide range of injuries, including fractures, dislocations, soft tissue injuries, and amputations, which disrupt the normal structure and function of the affected body part. In some cases, surgery may be needed to correct the deformity and restore normal function. Fractures can cause bone to heal in an abnormal position, while dislocations can cause joints to become misaligned, leading to asymmetry or loss of range of motion. Soft tissue injuries, such as burns, can also cause deformities by altering the normal contours of the skin and underlying structures. Facial trauma can cause fractures of the facial bones, leading to asymmetry or malocclusion. Amputation deformities occur when a limb is removed, due to injury or disease, which lead to misshapen or asymmetrical limbs or joints. This can result in a loss of function and mobility, as well as changes in body image and self-esteem. Prosthetics and physical therapy can help to restore some function, but the individual will never regain the full function of the amputated limb. Deformities caused by severe trauma may require surgical intervention to correct the problem and restore normal function. This can include things like realigning bones, stabilizing fractures with plates and screws, or reconstructing damaged soft tissue. In some cases, physical therapy may also be necessary to regain strength and range of motion in the affected body part. [88,89,90]

1-Psychological impact:

The psychological impact of a trauma-related deformity can vary greatly depending on the individual and the specific circumstances of the injury. It can be complex, multifaceted and long-lasting.

Patients may experience a wide range of emotional and psychological reactions, including: [88,89,90]

-Grief and loss: People who have lost a limb or have acquired a different altering body image injury may experience feelings of grief and loss. They may have to grieve the loss of their former self, the loss of a part of their identity, the loss of a body part that was important to them, and the loss of the ability to do things they used to enjoy.

This can be particularly difficult for people whose body's function was important to their sense of identity, such as a surgeon or an artist who has lost the use of a hand or a musician who has lost the use of a finger.

-Anger and frustration: People may feel angry and frustrated about the injury, particularly if they feel that it could have been prevented or if they feel that they have been dealt an unfair blow. They may also be angry with the healthcare system or insurance companies if they feel that they are not getting the care and support they need.

-Depression: Depression is a common emotional response to a trauma-related deformity. People who have sustained a trauma-related deformity may experience feelings of hopelessness, helplessness, and a loss of interest in activities they once enjoyed. They may also experience changes in their sleep and appetite patterns, have difficulty concentrating, and feel a sense of isolation and loneliness.

It is also important to mention that depression is a complex condition and can have different causes, sometimes not related to the physical deformity, but to other factors such as the trauma that led to the deformity or the way the person perceives the injury.

-Self-consciousness and shame: People who have sustained a trauma-related deformity may feel self-conscious about their appearance and may feel embarrassed or ashamed of their injury. They may also feel that they are being judged or stared at by others and may avoid social situations or activities that they once enjoyed.

Self-consciousness and shame can lead to social isolation, and may cause people to withdraw from friends and loved ones, leading to feelings of loneliness. They may also avoid activities they once enjoyed, leading to a decrease in their quality of life.

These feelings may be due to the individual's perception of the injury, as well as societal attitudes towards people with disabilities. Societal attitudes may not always be positive, and people with disabilities may be viewed as weak or dependent.

-Body image issues: People may have difficulty accepting the changes in their physical appearance and may feel that they are not the same person they were before the injury. They may also have difficulty with accepting the changes in their body and feel a sense of disconnection with their body.

-Stigma: People who have sustained a trauma-related deformity may feel stigmatized or discriminated against because of their injury. They may feel that others view them as weak or dependent, and may have difficulty with social interactions. It can also lead to isolation, feelings of worthlessness, and depression.

Stigma may come from different sources, from society in general, from people around them, from themselves or from the healthcare system. It may be related to the way the person is perceived by others, the way the person perceives themselves or the way the person perceives the healthcare system is treating them.

It is important to note that the psychological impact of trauma-related deformity not only affects the individual but also their loved ones and caregivers, they may also experience emotional distress and require support.

2-Repercussions:

The repercussions of a trauma-related deformity can be wide-ranging and can affect various aspects of an individual's life. Some of the potential repercussions of a trauma-related deformity include: [88,89,90]

-Physical limitations: A trauma-related deformity can result in physical limitations, depending on the severity of the injury. If someone has lost a limb, they may have difficulty performing daily activities such as dressing, grooming, and bathing. They may also have difficulty with activities they used to enjoy, such as sports, hobbies, or work-related activities. They may require ongoing physical therapy and rehabilitation to help them adapt to their new physical limitations.

-Social isolation: People may feel self-conscious about their appearance and may avoid social situations or activities that they once enjoyed, due to the fear of being judged or stared at. This can lead to feelings of isolation and loneliness. They may also feel stigmatized or discriminated against because of their injury, and may have difficulty with social interactions.

-Financial impact: Trauma-related deformities can result in significant medical expenses, including the cost of surgery, physical therapy, and rehabilitation. They may also lead to lost wages if the individual is unable to work due to their injury. Additionally, they may require additional medical equipment, such as prosthetics, which can also be costly.

It's important to keep in mind that each person's experience is unique and the repercussions can vary greatly depending on the individual and the specific circumstances of the injury. It is important for people who have sustained a trauma-related deformity to have access to appropriate support and treatment, including psychological support, to help them cope with the emotional and psychological impact of their injury and lead fulfilling lives.

3-Management:

The management of trauma-related deformities can be complex and multifaceted. It generally entails a combination of medical and psychological interventions. [88,89,90]

-Medical management: Medical management typically begins with surgery to repair the injury, which may include procedures such as skin grafts, or reconstruction of bones and soft tissues. After the surgery, physical therapy and rehabilitation are important to help the individual adapt to their new physical limitations. It may include exercises to improve strength, range of motion, and overall function.

The use of prosthetic devices and assistive technology can also be important in managing trauma-related deformities, they can help with tasks such as mobility, grasping objects and overall functionality.

-Psychological management: it typically involves counseling or therapy to help the individual cope with the emotional and psychological impact of their injury. This include individual counseling, group therapy, and/or support groups. Medications may also be prescribed to help alleviate symptoms of depression and anxiety. Counseling can help the individual process the trauma, cope with the changes in their life, and develop strategies for managing their emotions.

-Social and vocational rehabilitation: Social and vocational rehabilitation can be helpful in managing trauma-related deformities, as they can provide support and guidance on how to adapt to the changes in the individual's life. This may include assistance with finding new employment or adjusting to new work responsibilities, as well as assistance with navigating the healthcare system and accessing community resources. This can help the individual regain their independence, and feel a sense of purpose and fulfillment.

-Peer support: Peer support can be beneficial as well. Connecting with others who have been through similar experiences can help people feel less alone and provide a sense of understanding and validation. This can also provide a sense of community and belonging, which can be important for the emotional well-being of the individual.

It's important to keep in mind that the management of trauma-related deformities can be a lifelong process, and that the individual may need to adapt and make adjustments over time. Additionally, the management plan should be tailored to the individual's specific needs and goals, with the focus on helping the individual to live as independently and fulfilling as possible. It is also important to have a multidisciplinary team that includes doctors, nurses, physical therapists, occupational therapists, and psychological professionals working together to provide comprehensive care and support.

V-Immobility:

The notion of major trauma injuries is often synonymous with disability and immobilization, either it's motor and/or sensory deficits due to TBI, bone fractures, spinal injury...

Prolonged immobilization causes psychological changes that may cause significant repercussions. Changes in perception, cognition, affect (anxiety, depression, mood swings) are well illustrated within various settings of sensory deprivation caused by bed rest. [91]

Perceptual deformities going from daydreaming to hallucinations, somatic complaints, trouble concentrating and non-compliant conduct are well illustrated along sensory deprivation. [91]

These alterations have been reported in a number of non-medical situations such as solitary confinement prisoners, as well as medical cases including surgery and ICU and orthopedic patients.

Repetitious sounds such as vitals monitoring and technical dialogues from outside of the room can contribute to hearing deprivation.

Single isolated rooms furnished with minimal colors may worsen visual and social deprivation. [91]

The elderly are particularly exposed to the complications of immobilization. Aging physiological changes and common chronic illnesses are responsible of a decrease in physiologic reserve and a reduced ability to allow and tolerate the changes that follow bed rest.

1-Psychological impact:

Being immobilized can have a number of negative psychological effects, including feelings of frustration, boredom, and even depression.

It can be a difficult and frustrating experience, as it often involves being confined to a bed or other small spaces and being unable to engage in activities that one normally would. [92,93]

It can also lead to a sense of helplessness and a loss of independence, as one is often dependent on others for basic needs such as bathing, dressing, and getting around. This can be especially difficult for individuals who are used to being independent and self-sufficient.

In addition, being immobilized can result in a decline in physical and mental functioning, as the body and mind are not being used in the same way as they would be if the individual were able to move freely.

-Frustration:

Frustration can be a common emotional response to being immobilized. When an individual is unable to move freely, they may feel frustrated by their inability to carry out their usual activities or do things that they would normally enjoy. [92,93]

This frustration can be compounded by the lack of control that the individual may feel over their own body and their inability to fully participate in their own care.

The sense of frustration may be exacerbated by the individual's desire to recover and return to their normal routine as quickly as possible.

-Depression and anxiety:

Being immobilized can be isolating and can lead to feelings of loneliness and depression. When an individual is unable to move freely, they may not be able to participate in their usual social activities or spend time with friends and family in the same way that they did before. This can lead to a sense of social isolation and a lack of connection with others.

It can be a stressful and anxiety-provoking experience for many people, as it may include concerns about the underlying cause of the immobilization, and about the severity of their condition and the potential long-term effects.

In addition, being immobilized can lead to feelings of helplessness and a lack of control over one's own body and circumstances. These feelings can contribute to the development of depression.

That is why it's important for individuals who are immobilized to find ways to stay connected with others and to engage in activities that bring a sense of purpose and meaning. [92,93]

-Dependence:

Being immobilized can lead to a loss of independence, as the individual may be unable to carry out their usual tasks and activities without assistance. This can be frustrating and can lead to a sense of reliance on others.

The individual may feel that they are unable to fully participate in their own care and may feel dependent on others for basic needs such as bathing, dressing, and eating. This loss of independence can be difficult for individuals who are used to being self-sufficient and can lead to a decline in self-esteem.

It is important for individuals who are immobilized to find ways to maintain as much independence as possible, such as through physical therapy, occupational therapy, or other forms of rehabilitation.

It may also be helpful for the individual to set achievable goals for their recovery and to find ways to stay mentally and physically active. [92,93]

-Low self-esteem:

Being immobilized can have an impact on a person's sense of self-worth and self-esteem. Engaging in activities that are meaningful to a person and that contribute to their sense of purpose and identity can be an important part of maintaining good self-esteem.

When a person is unable to engage in these activities due to immobilization, it can be difficult for them to maintain a positive sense of self-worth.

Additionally, the physical limitations and challenges associated with immobilization can be difficult for a person to accept, and this can also affect their self-esteem.

It is common for people who are immobilized to feel a sense of loss or grief over the things that they are no longer able to do. [92,93]

-Cognitive decline:

It represents a decline in mental functioning, such as memory, concentration, and problem-solving. Being immobilized can lead to cognitive decline for a number of reasons.

First, the brain is not being stimulated in the same way as it would be if the individual were able to move freely. When an individual is unable to engage in their usual activities, the brain may not receive the same level of stimulation, which can lead to a decline in cognitive function.

In addition, being immobilized can disrupt an individual's sleep patterns, which can further contribute to cognitive decline. Sleep is important for brain health and a lack of sleep can lead to difficulties with memory and concentration.

2-Physical repercussions:

Immobilization is the act of keeping a part or the whole body still or inactive, sometimes through the use of a cast, brace, or splint.

When a person is immobilized, they are not able to move the affected body part as freely as they normally would. This can have several physical repercussions, depending on the duration and extent of immobilization. Some possible effects of immobilization include: [94]

-Muscle atrophy:

Muscle atrophy is the wasting away or shrinkage of muscle tissue.

It can occur when a muscle is not used for an extended period of time, such as when it is immobilized after a traumatic injury.

When a muscle is not being used, the body stops sending as many nutrients and oxygen to it. As a result, the muscle begins to break down and become smaller. This can lead to a decrease in muscle strength and mass.

-Decreased range of motion:

Range of motion is the extent to which a joint can be moved in different directions. Lack of use or immobilization of a joint can lead to a decrease in the range of motion. This can happen because the muscles and connective tissue around the joint become tight and stiff, and the joint itself may become swollen or inflamed.

Decreased range of motion can cause difficulty with daily activities and may lead to muscle imbalances and joint pain.

-Poor circulation:

Prolonged immobilization can lead to decreased circulation.

The circulatory system is responsible for delivering oxygen and nutrients to the body's cells and removing waste products. When a person is immobile, the blood can pool in the lower parts of the body, leading to reduced blood flow to the heart and other organs.

Decreased circulation can cause a variety of symptoms, including:

- Swelling: When blood flow is poor, fluid can accumulate in the tissues, leading to swelling.
- Numbness and tingling: Poor circulation can cause a lack of feeling or abnormal sensations in the extremities.
- Coldness: Poor circulation can cause the hands and feet to feel cold to the touch.
- Fatigue: Decreased circulation can cause tiredness and weakness.
- Decreased immune function: Poor circulation can weaken the immune system, making it harder for the body to fight off infection.
- Wound healing problems: When circulation is poor, it can take longer for cuts or wounds to heal.

The biggest risk that immobilization faces is deep vein thrombosis, which is a condition in which a blood clot forms in a deep vein, usually in the legs. It can be vital because the clot can break loose and travel to the lungs, causing a pulmonary embolism, which can be life-threatening.

Prolonged immobilization, such as sitting for long periods of time or being bedridden, can increase the risk of deep vein thrombosis. This is because when the body is inactive, blood can pool in the veins and the blood may not flow as well, increasing the risk of a clot forming.

-Pressure sores:

Pressure sores, also known as bedsores or decubitus ulcers, are areas of damaged skin and tissue that develop when a person is immobile or spends a lot of time in one position. They most commonly occur on bony areas of the body, such as the heels, ankles, tailbone, and lower back, where there is less muscle and fat to protect the skin.

Pressure sores are caused by prolonged pressure on one area of the body, which cuts off the blood supply to the skin and underlying tissues. This can cause the skin and tissue to die, leading to an open wound. Pressure sores can be very painful and take a long time to heal. In severe cases, they can become infected and may require hospitalization and surgical treatment.

As a preventive measure, it is important to move and change positions frequently, especially if you are bedridden. Using a specialized mattress or cushion can also help to reduce pressure on the skin.

3-Management:

Immobilization is often necessary to provide the best recovery outcome after severe traumatic injuries. However, it can result in dire repercussions, both mentally and physically. Which is why it's necessary to educate individuals on how to manage this delicate period of recovery. [95]

It is important for patients who are immobilized to find ways to stay mentally active in order to maintain cognitive function, and to stay connected with friends and family and seek support if needed. This may involve engaging in activities such as assisting support groups, reading, puzzles, or brain games.

It may also be helpful for the individual to participate in physical therapy or occupational therapy, as these types of therapy can help to stimulate the brain and improve cognitive function.

Physiotherapy is necessary to prevent muscle atrophy and decreased motion of range, by performing range of motion exercises or other exercises that do not put strain on the affected body part. It is recommended to also consider using assistive devices, such as weights or resistance bands, to help maintain muscle mass. [95]

To prevent poor circulation as a repercussion of immobilization, keeping the affected body part elevated above the level of the heart, staying active by performing range of motion exercises and wearing compression socks can help improve circulation. It is important as well to move and change positions frequently, while using a specialized mattress or cushion to help with pressure sores.

VI-Secondary psychiatric disorders [96]:

1-Acute stress disorder:

1-1-Definition:

Acute stress disorder is a short-term psychiatric condition occurring as a dysfunctional and intense reaction in the immediate aftermath of a traumatic event and lasts for a period of less than four weeks.

It is characterized by symptoms such as intense fear, agitation, and confusion, as well as symptoms of re-experiencing the traumatic event, such as flashbacks and nightmares. These symptoms usually begin within hours or days of the traumatic event and can last up to a month. [96]

1-2-Diagnosis criteria [96]:

→Criterion A:

Exposure to actual death or threat of death, serious injury or sexual violence in one or more of the following ways:

- By directly experiencing traumatic event(s).

- By directly witnessing traumatic event(s) that occurred to others.
- By learning that traumatic event(s) have occurred to a close family member or friend.
- By being repeatedly or extremely exposed to aversive details of the traumatic event(s) (collection of human bodies and remains, child abuse details).

N.B.: this doesn't include electronic and televised exposure, only if it occurred in a professional context.

→ Criterion B:

The presence of nine (or more) of the following symptoms from any of the five categories below: intrusive symptoms, negative mood, dissociative symptoms, avoidance symptoms, and arousal symptoms, beginning or worsening after the occurrence of the traumatic event(s) in question:

Intrusive Symptoms:

- Repetitive, involuntary, and distressing memories of the traumatic event(s).
- Repetitive distressing dreams in which the content is related to the traumatic event(s).
- Dissociative reactions, such as flashbacks, in which the individual feels or acts as if the traumatic event(s) were happening again (such reactions can occur on a continuum, the most extreme being a complete loss of consciousness).
- Intense or prolonged psychological distress at exposure to internal or external cues that symbolize or resemble an aspect of the traumatic event(s).

Negative Mood:

- Persistent inability to experience positive emotions, such as happiness, satisfaction, or affection.

Dissociative Symptoms:

-Impairment in perception of reality, the environment, or oneself (seeing oneself in a distorted way, being in a daze, or perceiving time as slowed down).

-Inability to recall important aspects of the traumatic event(s) (typically due to dissociative amnesia and not due to other factors such as traumatic brain injury and substance use).

Avoidance Symptoms:

-Efforts to avoid distressing memories, thoughts, or feelings related to or associated with the traumatic event(s).

-Efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings related to or associated with the traumatic event(s).

Arousal Symptoms:

-Sleep Disturbance (difficulty falling asleep or staying asleep, restless sleep).

-Irritable or angry behavior (with little or no provocation) that is typically expressed as verbal or physical aggression towards people or objects.

-Hypervigilance.

-Difficulty concentrating.

-Exaggerated startle response.

→ Criterion C:

The duration of the disturbance (Criterion B symptoms) is 3 days to 1 month after exposure to trauma.

N.B.: Symptoms typically begin immediately after the trauma but they must persist for at least 3 days and up to 1 month to meet the diagnostic criteria for the disorder.

→Criterion D:

The disturbance causes clinically significant distress or impairment in social, professional, or other important areas of functioning.

→Criterion E:

The disturbance is not due to the physiological effects of a substance (medication or alcohol) or another medical condition (mild traumatic brain injury), and is not better explained by a brief psychotic disorder.

The essential characteristic of acute stress disorder is the development of persistent symptoms for 3 days to 1 month after exposure to traumatic event(s) [127]. These traumatic events are not necessarily fatal or debilitating illnesses. Medical incidents that are considered traumatic events involve sudden, catastrophic events, such as waking up during surgery and anaphylactic shock. Stressful events that do not have the severe and traumatic characteristics of criterion A can lead to a diagnosis of adjustment disorder but not acute stress disorder. The clinical presentation of acute stress disorder can vary among individuals but typically involves an anxious reaction associated with some form of reliving or reactivity to the traumatic event [127]. In some people, a dissociative or detached presentation may be prominent, although these individuals also typically have intense emotional or physiological reactions to trauma reminders. In other individuals, there may be a strong anger reaction characterized by irritability or even aggressive responses.

The symptoms must be present for at least 3 days after the traumatic event and the diagnosis can only be made within 1 month after the event. Symptoms that appear immediately after the event but resolve within 3 days do not meet the criteria for acute stress disorder.

Although acute stress disorder can evolve into post-traumatic stress disorder (PTSD) after 1 month, it can also be a transient stress response that improves within the month following trauma exposure and does not lead to PTSD [127]. Approximately half of individuals who develop PTSD initially develop acute stress disorder [127]. Symptoms may worsen during the first month, often in response to persistent stress factors or the occurrence of new traumatic events [128].

1-3-Risk factors:

-Temperamental factors: Risk factors include the presence of previous mental disorders, high levels of negative affectivity (neuroticism), a perceived greater severity of the traumatic event, and an avoiding coping style [129,130,131]. Catastrophic valuations of the traumatic experience, often characterized by exaggerated assessments of future harm, guilt, or loss of hope, are strongly predictive of acute stress disorder [132,133].

-Environmental factors: It goes without saying that an individual must be exposed to a traumatic event to be at risk of developing acute stress disorder. Risk factors include previous traumatic experiences. [134,130,131]

-Genetic and physiological factors: Women are more at risk of developing acute stress disorder [134,130,131]. A high reactivity, manifesting as an exaggerated response to noise, present before exposure to trauma, increases the risk of developing acute stress disorder. [135]

2-Post-traumatic stress disorder:

2-1-Definiton:

Post-traumatic stress disorder is a severe psychiatric disorder occurring in the aftermath of a potentially traumatic event classically defined as an unexpected confrontation with the reality of death.

This disorder is very debilitating for the subjects who develop it since they are faced with constantly reliving this trauma, through intense flashbacks and reminiscences, leading them to repeatedly experience the same sensations they had to encounter during the traumatic event. [96]

2-2-Diagnosis criteria:

The new edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) brings significant changes to the diagnosis.

PTSD has been moved from the anxiety disorders category to a new category: trauma and stress-related disorders.

The creation of this new category results from the clinical observation of distress manifestations specific to traumatic events. [96,97]

➔Criterion A: a potentially traumatic event

It refers to having been confronted (by threat or in reality) with death, a severe injury, a risk to physical integrity or sexual violence, in the following ways:

- Experiencing the traumatic event directly or as a witness
- Learning that a loved one has experienced a traumatic event
- Being repeatedly exposed to morbid and horrifying details regarding trauma (collection of human bodies and remains, child abuse details, ...)

➔Criterion B: intrusive thoughts

It includes repetitive, involuntary and invasive memories of the traumatic event(s) manifesting itself under the form of revivals, daytime flashbacks, recurring nightmares with a sense of distress.

Dissociative reactions, where the patient feels or acts as during the trauma event, out of fear of re-experiencing the same trauma, are also encountered.

The psychological distress feeling is major when exposed to recall stimulus, as well as physiological reactions (tachycardia, sweating...)

→ Criterion C: avoidance

It refers to persistent avoidance of stimuli associated with the traumatic event(s), beginning afterwards, as evidenced by the presence of one or both of the following:

- Avoidance or efforts to avoid memories, thoughts, or feelings regarding or associated with the traumatic event(s), that arouse a feeling of distress.
- Avoidance or efforts to avoid external reminders (people, places, conversations, activities, objects, situations) that arouse distressing memories, thoughts, or feelings associated with or similar to the traumatic event(s).

→ Criterion D: cognitive and mood impairment

It includes negative cognitive and mood impairments associated with the traumatic event(s), beginning or worsening after the occurrence of the event(s), as evidenced by two (or more) of the following:

- Inability to recall an important aspect of the traumatic event (due to dissociative amnesia, not other factors such as brain injury or substance use).
- Persistent and amplified negative beliefs or expectations about oneself and others ("I am bad" "nobody is trustworthy" "everything and everyone is dangerous" "my nervous system is permanently damaged").
- Persistent cognitive distortions about the cause or consequences of the trauma that lead the individual to blame themselves or others.
- Persistent negative emotional state (fear, anger, guilt, shame...)
- Distinctly diminished interest or participation in important activities.

-Feeling of detachment or estrangement from others.

-Persistent inability to experience positive emotions (inability to feel happy, satisfied, or loving).

➔ Criterion E: Hyper arousal / hyper reactivity

Noticeable arousal and reactivity impairments associated with the traumatic event(s), starting or worsening after the event(s) occur, as evidenced by two (or more) of the following:

-Irritable or angry behavior (with little or no provocation) typically expressed through verbal or physical aggression towards people or objects.

-Reckless or self-destructive behavior.

-Hypervigilance.

-Exaggerated startle response.

-Concentration problems.

-Sleep disturbance (difficulty falling asleep, interrupted or agitated sleep).

➔ To define the post-traumatic stress disorder [96]: criteria B, C, D and E symptoms must persist for more than a month (Criterion F), cause significant clinical suffering and social or professional repercussions (Criterion G) and not be related to the effects of a substance use or a medical condition (Criterion H).

The essential characteristic of post-traumatic stress disorder is the development of characteristic symptoms after exposure to the traumatic event(s). Emotional reactions to the experience such as fear, helplessness, and horror are no longer part of Criterion A. [96]

The clinical presentation of PTSD varies from one individual to another. In some patients, the fear of reliving the traumatic experience along with the emotional and behavioral symptoms may be prominent. In other individuals, arousal and externalized reaction symptoms are predominant, while in others, dissociative symptoms are prominent. Some people may present combinations of these symptoms.

The disorder can be particularly severe and long-lasting when the stress factor is interpersonal and intentional (in torture, sexual violence).

The trauma can be re-experienced in several ways. Usually, the individual has intrusive, recurrent, and involuntary memories of the event (criterion B). The intrusive memories in PTSD differ from depressive rumination in a way that they only pertain to painful, involuntary, and intrusive memories. The focus is on recurrent memories of the event, which usually include sensory, emotional, or physiological behavioral elements. A frequent symptom of re-experience is the distressing dream that replays the event itself or what is referring or thematically related to the major threats involved in the traumatic event (criterion B). The individual may experience dissociative states that last from a few seconds to several hours or even days, during which elements of the event are relived, and the individual behaves as if the event was recurring (criterion B). Such events occur on a continuum from brief visual intrusions or other sensory intrusions related to the traumatic event without loss of reality orientation, to complete loss of consciousness of the current environment.

These episodes, often referred to as flashbacks, are typically brief but can be associated with prolonged distress and hyper arousal.

Feelings of intense psychological distress or physiological reactions often occur when the individual is exposed to trigger events that resemble an aspect of the traumatic event or symbolize it. The trigger factor can be a physical sensation (dizziness for survivors of a traumatic brain injury, tachycardia for a previously traumatized child), particularly in individuals for whom the clinical picture is rich in

somatic symptoms. The stimuli associated with the trauma are constantly avoided. The individual generally makes deliberate efforts to avoid thoughts, memories, feelings or conversations associated with the traumatic event, and avoid activities, objects, situations or people that remind him of it (criterion C).

Negative cognition or mood impairments associated with the event begin or worsen after exposure to the event. These negative alterations can take various forms, including the inability to remember an important aspect of the traumatic event; such amnesia is typically due to dissociative amnesia and not to head trauma, alcohol, or drugs (criterion D). Another form consists of persistently exaggerated negative expectations regarding important aspects of life concerning oneself or others, or regarding the future, which can manifest as negative alteration in apparent self-identity since the trauma. Individuals with PTSD may have persistent cognitive distortions about the cause of the traumatic event that lead them to blame themselves or others. [96] The individual may experience a significant reduction in interest in previously enjoyed activities or a decrease in participation in these same activities, a feeling of detachment from others or becoming a stranger to others, or a persistent inability to experience positive emotions (especially happiness, joy, satisfaction, or emotions associated with intimacy, tenderness, and sexuality).

Individuals with PTSD may exhibit episodes of anger or even verbal and/or physical aggressive behavior with little or no provocation (criterion E). They may also have reckless or self-destructive behaviors such as reckless driving, excessive alcohol or drug use, or self-harm or suicidal behaviors (criterion E). PTSD is often characterized by increased sensitivity to potential threats, including those related to the traumatic experience (being particularly sensitive to the potential threat posed by cars or trucks after a car accident) and those not related to the traumatic event (fearing having a heart attack) (criterion E). Individuals with PTSD may be highly reactive to unexpected stimuli, showing exaggerated startle reaction or nervousness in response to

loud noises or unexpected movements. Difficulties with concentration, including difficulty remembering daily events or paying attention to specific tasks are commonly reported (criterion E). Difficulty falling asleep and maintaining sleep are common and may be associated with nightmares and concerns about safety or a general level of hyper arousal that interferes with the quality of sleep (criterion E). Some individuals also experience persistent dissociative symptoms of detachment from their bodies (depersonalization) or the world around them (derealization). [96]

The disorder may be associated with a regression in development, such as the loss of language in young children. There may also be pseudo-auditory hallucinations, such as the sensory experience of hearing one's thoughts spoken in one or more different voices, and ideas of persecution. In the aftermath of prolonged, repeated, and severe traumatic events, the individual may also have difficulty managing emotions or maintaining stable interpersonal relationships.

When the traumatic event is a violent death, both problematic grief and PTSD symptoms may be present. [96]

2-3-Risk factors:

Risk factors should be considered on a continuum including pre-trauma, peri-trauma (around the time of the trauma) and post-trauma.

Such a study could facilitate the identification of subjects at risk and the use of interventions to reduce this risk. [96]

➔Pre-trauma:

-Temperamental factors: These include early childhood emotional problems (prior traumatic exposures, anxiety problems) and prior mental disorders (panic disorder, depression, PTSD, or obsessive-compulsive disorder).

-Environmental factors: These include low socio-economic status, low educational level, prior exposure to trauma (especially in childhood), adverse childhood circumstances (poverty, family dysfunction, parental loss or separation), cultural characteristics (fatalistic or self-blaming coping strategies), low cognitive functioning, minority ethnic status, and family psychiatric history.

The presence of social support before exposure to the event is proven to be protective, just as above-average cognitive ability. Subjects with strong emotional bonds have fewer PTSD symptoms

-Genetic and physiological factors: these include the female gender and young age at the time of exposure to trauma (for adults). Certain genotypes may be protective or increase the risk of PTSD following exposure to traumatic events. [96]

➔ Peri-trauma:

They are mainly represented by environmental factors, that include the following: the severity (degree) of trauma (the greater the extent of trauma, the greater the likelihood of PTSD), the perception of a deadly threat, physical injuries, interpersonal violence (especially when the trauma is committed by someone who is in charge of the subject) and, for military personnel, being the perpetrator of violence, witnessing atrocities, or killing the enemy. Additionally, the occurrence of dissociation during trauma and its persistence after trauma are a risk factor. [96]

➔ Post-trauma:

-Temperamental factors: These include negative evaluations, inadequate coping strategies and the development of acute stress disorder.

-Environmental factors: These include subsequent exposure to repeated distressing reminders, subsequent adverse life events, and financial or other losses related to the trauma. Social support (including, for children, family stability) is a protective factor that moderates the aftermath of trauma.[96]

➔Other factors:

-Resilience: Resilience is a complex multidimensional construct that encompasses psychological, social, and biological factors. Resilient individuals tend to have a positive outlook and a sense of purpose, they possess good problem-solving and coping skills, have good social support networks, and are able to regulate their emotions effectively. They also tend to have a well-functioning nervous system that is able to adapt to stress and return to a state of equilibrium.

From a biological perspective, Resilience is associated with the ability of the body to mount an appropriate stress response and then return to a state of homeostasis. The hypothalamic-pituitary-adrenal (HPA) axis and the sympathetic nervous system (SNS) play important roles in the stress response. Resilient individuals have a more efficient HPA axis response and are able to recover faster from stress, which is important in preventing the development of PTSD.

Moreover, Resilience is also linked to changes in the brain, specifically the prefrontal cortex (PFC) and the hippocampus. Resilience is associated with increased activity in the PFC, which is important for the regulation of emotions and cognitive processes, and in the hippocampus which is important for memory and learning. The hippocampus also plays an important role in the regulation of the HPA axis, so when it's well functioning it can lead to a better regulation of the stress response. According to some studies, a small hippocampus is associated with the disorder. [97]

In summary, Resilience is associated with the ability to adapt and recover from stress and trauma, and it's thought to be a protective factor against PTSD by allowing the body and brain to mount an appropriate stress response and recover more efficiently.

-Hazardous workplaces: they can be defined as workplaces that expose employees to physical and psychological risks. These risks can come from various sources, such as exposure to dangerous conditions, violence, accidents, and natural disasters.

For example, in the case of emergency responders, first responders, and health care workers, their work often involves exposure to traumatic events, such as accidents, natural disasters, and violent incidents. They may also have to deal with the emotional and physical strain of their work, which can lead to chronic stress. This chronic exposure to traumatic events and stress can increase the risk of developing PTSD.

Additionally, people who work in hazardous workplaces, such as construction sites, mines, and oil rigs, are at a higher risk of physical injuries, which can lead to prolonged recovery times and increased stress, both of which can contribute to the development of PTSD.

Moreover, people working in certain fields, such as military personnel, law enforcement, and humanitarian aid workers, may also be at risk of direct exposure to violence, war or other atrocities, increasing the risk of developing PTSD.

It's also worth mentioning that the impact of hazardous workplaces on mental health is not only limited to PTSD, but also may affect individuals in different ways, such as depression, anxiety, and other mental health conditions. [96]

3-Substance use disorders:

3-1-Definition:

The essential characteristic of a substance use disorder is a set of cognitive, behavioral, and physiological symptoms indicating that the subject continues to consume the substance despite significant problems related to it. [96]

Another important characteristic of substance-related disorders is an underlying change in brain circuits that may persist beyond detoxification, particularly in subjects with severe disorders. The behavioral effects of these brain changes may manifest as repeated relapses and an imperative urge to consume the substance when individuals are exposed to substance-related stimuli. These persistent effects of the substance may benefit from long-term therapeutic approaches. [96]

Substance use disorder refers to a problematic use of a substance leading to an impairment or clinically significant distress, characterized by the presence of at least two of the following manifestations, during a period of 12 months:

- The substance is often consumed in greater quantity or for a longer period than intended.
- There is a persistent desire, or unsuccessful efforts, to cut down or control substance consumption.
- A great deal of time is spent in activities necessary to obtain the substance, use it, or recover from its effects.
- Strong craving, desire or urge for consumption.
- Recurrent substance use resulting in failure to fulfill major obligations at work, school or home.
- Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance.
- Important social, occupational or recreational activities are given up or reduced because of substance use.
- Recurrent substance use in situations where it is physically hazardous.

- Substance use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by its consumption.
- Tolerance, as defined by either a need for significantly increased amounts to achieve intoxication or desired effect, or a significantly diminished effect with continued use of the same amount.
- Withdrawal as manifested by either the characteristic withdrawal syndrome for the specific substance, or by the consumption of the substance (or a closely related substance) to relieve or avoid withdrawal symptoms. [96]

These substances often belong to numbered substance classes, but for severe trauma patients, the most frequent ones are:

- Opioids: to treat severe physical pain
- Benzodiazepines: to treat anxiety and sleep disorders
- Anti-depressants: to treat depression and PTSD symptoms
- Illicit drugs such as cannabis, cocaine, heroin and methamphetamine
- Alcohol.

3-2-Drug use disorder:

Illicit drugs or “narcotics” refer to psychoactive substances that are not medically prescribed, and whose consumption and manipulation are prohibited by law.

In the context of trauma patients, illicit drug use can complicate the healing process and impede recovery. They can interact negatively with prescribed medications, making them less effective. They can also lead to a variety of physical and mental health problems, such as respiratory failure, heart attack, stroke, depression, anxiety, and psychosis. Additionally, illicit drug use can lead to risky behaviors and can negatively impact social and occupational functioning.

They represent a group of substances that differ widely in terms of composition, form, effects and health risks. [98]

This can include a wide range of substances, such as marijuana, cocaine, heroin, and methamphetamine. They can be mainly organized into three classes according to their main effects:

- Depressants like heroin that act by slowing down the central nervous system functioning, the psychic functions as the physical ones. they also lower the level of arousal and relieve pain.
- Stimulants like cocaine, Methylenedioxymethamphetamine (MDMA) /ecstasy or amphetamines, that work the opposite way by speeding up the central nervous system functioning, and increase arousal and alertness. They also reduce hunger and tiredness feelings.
- Disruptors that are neither pure depressants nor pure stimulants, such as cannabis and hallucinogens such as Lysergic acid diethylamide (LSD). These substances disrupt psychic functions, alter brain and cognitive functions, and distort sensory perceptions.

Disorders associated with their abuse are linked with an occurrence risk of other health problems such as HIV/AIDS, hepatitis, tuberculosis, suicide, death by overdose and cardiovascular diseases. [98]

Drug abuse and addiction represents a huge public health problem with serious consequences. Their disorders can have a devastating effect on people's lives, leading to social problems, poor job or academic performance, personal hygiene issues, increased impulsiveness, as well as a loss of interest in usual hobbies and activities. [98]

It is important for trauma patients and healthcare providers to be aware of the risks associated with illicit drug use and to address any substance use issues during treatment and recovery. This might include referral to addiction specialist and/or rehabilitation programs, and developing a plan for recovery to help patients maintain sobriety, and prevent relapse.

3-3-Prescription drug misuse:

Prescription drug misuse refers to the use of medication in a manner that is different from how it was prescribed. This can include taking a higher dose than prescribed, or taking a medication for a different purpose than it was prescribed for. In the context of trauma patients, this may include the use of pain medications or sedatives in a way that is not prescribed or intended by a medical professional. [78,80,98]

Anti-depressants, sedatives such as benzodiazepine, and especially opioids constitute the most frequent type of drugs used by patients with major trauma injuries, since they mainly treat pain, anxiety, depression, PTSD symptoms and sleep disorders.

Taken correctly, prescription drugs can be effective in helping people. However, they can cause more harm than good if misused or abused.

Their abnormal use can lead very quickly to a substance use disorder, paving way easily to addiction, and even death by overdose.

Opioids are a class of drugs that are commonly prescribed for pain management, such as oxycodone, fentanyl, and morphine. They work by binding to specific receptors in the brain and spinal cord, which can reduce the perception of pain and also produce a sense of euphoria. However, when taken in higher doses or for an extended period of time, they can lead to physical dependence and addiction. Long-term use of opioids can also cause a variety of negative side effects, such as drowsiness, constipation, and respiratory depression. [78,80,98]

Benzodiazepines are a class of drugs that are commonly prescribed for anxiety, such as diazepam and alprazolam. They work by increasing the activity of a neurotransmitter called GABA, which can have a calming effect on the body. However, when taken in higher doses or for an extended period of time, they can lead as well to physical dependence and addiction. Long-term use of benzodiazepines can also cause a variety of negative side effects, such as drowsiness, memory impairment, and impaired motor function.

Antidepressants are commonly prescribed for depression, such as fluoxetine, sertraline, and venlafaxine. They work by altering the levels of certain neurotransmitters in the brain, such as serotonin and norepinephrine. Antidepressants can take several weeks to become effective and different antidepressants work differently for different people. Misuse of antidepressants is less common, but can lead to negative effects such as agitation, restlessness, and confusion.

Misuse of these drugs can lead to a number of negative effects, including addiction, tolerance, and overdose. It is important for trauma patients and healthcare providers to be aware of the risks associated with these drugs and to use them responsibly. [78,80,98]

3-4-Alcohol use disorder:

Alcohol use disorder refers to a pattern of alcohol use that leads to significant impairment or distress. It is characterized by the presence of symptoms such as tolerance, withdrawal, and difficulty controlling the amount of alcohol consumed. It can range from mild to severe, and it can have a wide range of negative effects on physical and mental health.

In the context of trauma patients, alcohol use as well can complicate the healing process and impede recovery. Alcohol can interact negatively with prescribed medications, making them less effective. It can also lead to a variety of physical and mental health problems, such as liver damage, pancreatitis, depression, and anxiety. [99]

Alcohol is a sedative and a depressant, which can have a negative impact on the patient's mental state and cognitive abilities. It can also affect the patient's ability to sleep and make it more difficult for the patient to cope with the trauma they have experienced.

It is important for trauma patients and healthcare providers to be aware of the risks associated with alcohol use disorder and to address any alcohol use issues during treatment and recovery. This might include referral to addiction specialist and/or rehabilitation programs, and developing a plan for recovery to help patients maintain sobriety, and prevent relapse. It's also important to note that alcohol dependence can be serious and can require professional help to overcome. [99]

4-Other disorders

4-1-Other anxiety disorders

A-Generalized Anxiety Disorder

The essential characteristic of generalized anxiety disorder is excessive anxiety and worry regarding several events or activities. [96]

The intensity, duration, or frequency of anxiety and worry are disproportionate to the actual likelihood or impact of the anticipated event.

The subject has difficulty controlling their concerns and preventing worrying thoughts from interfering with the execution and the attention paid to current tasks. People with generalized anxiety disorder often worry about daily life circumstances such as work responsibilities, financial problems, family health, children's misfortunes, or minor matters. [96]

Excessive anxiety and worry occur most of the time for at least 6 months, and are accompanied by at least three additional symptoms (only one is required in children), such as agitation, fatigue, difficulty concentrating, irritability, muscle tension and sleep

disturbance, leading to distress or clinically significant impairment in social, professional, or other important functioning. This disorder is not due to the physiological effects of a substance (for example, a drug abuse, a prescribed medication misuse) or another medical condition (hyperthyroidism), and it is not better explained by another mental disorder, such as anxiety or worrying about having another panic attack in panic disorder, anxiety in social anxiety disorder, other obsessions in obsessive-compulsive disorder, weight gain in anorexia nervosa, memories of traumatic events in post-traumatic stress disorder, content of delusional beliefs in schizophrenia... [96]

Trauma can participate in the occurrence of generalized anxiety disorder by triggering the development of anxiety symptoms following a traumatic event. The trauma may lead to a heightened state of arousal and increased sensitivity to perceived threats, which can cause the individual to experience excessive and uncontrollable worry and anxiety. [96] This can also lead to changes in the brain's stress response system, which can make the individual more susceptible to developing the disorder. Additionally, trauma can cause the individual to develop negative beliefs and attitudes about themselves and the world, which can contribute to the maintenance of the symptoms.

B-Panic disorder

Panic disorder refers to recurrent and unexpected panic attacks, which can be defined as a sudden rush of intense fear or discomfort that reaches its peak within a few minutes, with the occurrence of at least four additional symptoms, such as palpitations or tachycardia, sweating, trembling or muscle twitching, feelings of "gasping for air" or suffocation, strangulation feeling, chest pain or discomfort, nausea or abdominal discomfort, dizziness, chills or hot flashes, paresthesia (numbness or tingling), derealization (unreality feelings) or depersonalization (being detached from oneself), fear of losing self-control or "going crazy", and fear of dying. [96]

On the other hand, at least one of the panic attacks was followed by a period of at least one month of at least one of the following two symptoms:

- Persistent fear or concern about having panic attacks or about their consequences (losing self-control, having a heart attack, fear of going crazy).
- Significant and maladaptive behavior change in relation to panic attacks (behaviors related to avoiding the triggering of a panic attack, such as avoiding unfamiliar exercises or situations).

In addition to concerns about having panic attacks and their consequences, many individuals with panic disorder report feelings of constant or intermittent anxiety which are more generally related to physical and mental health concerns. [96]

Trauma can contribute to the development of panic disorder by altering the way a person's brain processes and responds to fear and stress. Traumatic events can cause changes in the levels of certain neurotransmitters and hormones, as well as in the structure and function of certain brain regions. These changes can make a person more susceptible to experiencing panic attacks and to developing panic disorder. Additionally, traumatic events can also lead to the development of negative thoughts and beliefs, which can contribute to the maintenance of panic disorder symptoms.

4-2-Mood disorders

A-Major depressive disorder

It refers to the presence of at least five of the following symptoms during the same period of 2 weeks while representing a change from past functioning; At least one of the symptoms is either depressed mood or loss of interest or pleasure. [96]

- Depressed mood practically present all day, almost every day, reported by the patient (feeling sad, empty, hopeless) or noticed by others (crying).

- Decreased interest or pleasure in all or nearly all activities almost all day and every day (reported by the patient or observed by others).
- Significant weight loss or gain without going through a diet (change in body weight exceeding 5% in one month) or decreased or increased appetite almost every day.
- Insomnia or hypersomnia almost every day.
- Agitation or psychomotor slowing almost every day (observed by others, not limited to a subjective feeling of restlessness or slowing down).
- Fatigue or loss of energy almost every day
- Excessive or inappropriate feelings of worthlessness or guilt (which may be delusional) almost every day
- Decreased cognitive abilities such as thinking, concentrating or indecisiveness, almost every day (reported by the person or others).
- Recurrent thoughts of death (not just a fear of dying), recurrent suicidal thoughts without a specific plan, suicide attempt or a plan to commit suicide.

These symptoms induce a clinically significant distress or a functioning impairment, either social, professional or in other important domains.

Diagnosis criteria for major depressive disorder must be present almost every day to be considered fulfilling, except for weight changes and suicidal thoughts [96]. Depressed mood must be present most of the time during the day, in addition to being so almost every day.

Insomnia and fatigue are complaints frequently put forward, and the absence of a full assessment of other depressive symptoms can lead to an underdiagnosis. Sadness can be denied initially but can be brought to light during the interview or inferred from facial expression or demeanor. [96]

Trauma can contribute to the onset of the disorder in several ways. It can lead to changes in the levels of certain neurotransmitters and hormones, such as cortisol and adrenaline, which can impact a person's mood and ability to cope with stress. Trauma can also lead to negative changes in the way the brain processes and responds to emotional information, making a person more likely to experience negative emotions such as sadness, guilt, hopelessness and shame.

B-Manic episode

It refers to a clearly delineated period of time during which the mood is elevated, expansive, or abnormally and persistently irritable, with an abnormally and persistently increased goal-directed activity or energy, persistent most of the time, almost every day, for at least a week (or any other duration if a hospitalization is necessary). [96]

During this period of mood disturbance and increased energy or activity, at least 3 of the following symptoms (4 if mood is only irritable) are present with significant intensity and represent a noticeable change compared to the usual behavior: [96]

- Increased self-esteem or ideas of grandeur
- Reduced need for sleep (the patient feels rested after only a couple of hours of sleep).
- Greater communicability than usual or constant desire to talk.
- Leakage of ideas or feeling like thoughts are flowing.
- Distractibility, as in attention is too easily drawn to unimportant and irrelevant external stimuli, reported or observed.
- Increased goal-directed activities (social, professional, academic, or sexual) or psychomotor agitation (aimless, non-goal-directed activity).

- Excessive engagement in activities with potential harmful consequences (the person launches without restraint into reckless purchases, inconsequential sexual conduct or unreasonable business investments).

The mood disturbance is severe enough to cause palpable impairment to professional or social functioning, or to require hospitalization in order to prevent harmful consequences for the subject or for others. [96]

Trauma can contribute to the occurrence of manic episodes by altering the way a person's brain processes and responds to emotional information, which can make them more susceptible to developing bipolar disorder.

The DSM-5 defines Bipolar Disorder as a mental disorder characterized by periods of elevated or irritable mood (mania or hypomania) and periods of depression. The elevated moods can last for days or weeks and include symptoms such as increased energy, reduced need for sleep, grandiose thoughts, impulsive behavior, and increased risk-taking. The depressive periods can last for similar lengths of time and include symptoms such as loss of energy, difficulty sleeping, feelings of worthlessness or guilt, and thoughts of death or suicide. To diagnose Bipolar Disorder, the elevated or depressive moods must be severe enough to cause significant impairment in an individual's life.

4-3-Sleep disorders:

Sleep disorder is a condition that prevents the subject from either falling asleep, having a good quality sleep, or having a normal sleep course. [96]

A-Parasomnia:

It is characterized by involuntary and unwanted physical behavior occurring either entering, during or emerging from sleep. It refers to Central Nervous System manifestations, transmitted to the muscular and vegetative system.

It can be responsible of physical injuries, but especially sleep disturbances for oneself and others. They can include several types, confusional awakenings, night terrors and sleep-related hallucinations are the most observed ones in major trauma patients.

B-Insomnia:

It is a subjective complaint of the patient reporting a difficulty falling asleep, a difficulty maintaining sleep, early awakenings and poor sleep quality. It can take several forms:

- Having trouble falling asleep: initial insomnia.
- Mid-night awakenings and having trouble going back to sleep:,maintenance insomnia.
- Waking up early in the morning without being able to go back to sleep: terminal insomnia.

It can be caused by a variety of factors, including pain, anxiety, and changes in sleep patterns.

Persistent pain can be a major contributor to insomnia in severely injured patients. The pain may be caused by the injury itself, or it may be related to other conditions that have developed as a result of the injury. [101]

Pain can disrupt the natural sleep-wake cycle in a number of ways. It can make it difficult to fall asleep in the first place, and it can also cause frequent awakenings during the night. In addition, chronic pain can lead to increased levels of stress and anxiety, which can further disrupt sleep.

Anxiety is a common problem among people who have been severely injured, and it can contribute to insomnia in a number of ways.

For example, a person who has suffered a severe injury may experience anxiety about their physical condition and their ability to recover. They may worry about financial issues, such as how to pay for medical bills or how to support themselves or their family if they are unable to work. They may also worry about the impact of the injury on their relationships, their career, and their overall quality of life.

All of these worries can make it difficult for a person to relax and fall asleep. They may find themselves thinking about their concerns or worrying about the future, which can keep them awake at night. In addition, anxiety can lead to physical symptoms such as tachycardia or difficulty breathing, which can also disrupt sleep.

Finally, a severe injury can disrupt the body's natural sleep-wake cycle in a number of ways.

For example, being in a hospital or rehab facility can disrupt a person's natural sleep-wake cycle. The constant activity and noise in these settings can make it difficult to fall asleep or stay asleep.

A severe injury may require a person to follow a different sleep schedule than they were used to before the injury. For example, they may need to take medications or receive treatments at certain times of the day, which can disrupt their normal sleep routine.

It can also be physically and emotionally exhausting, as it is not uncommon for people to feel very tired in the days and weeks following an injury. This fatigue can make it harder to fall asleep or stay asleep.

The subject may also experience discomfort due to the injury or due to the position they need to be in to allow the injury to heal. This discomfort can make it difficult to fall asleep or stay asleep. [101]

4-4-Personality disorders: [100]

A traumatic experience is a significant life event that can have a profound impact on an individual's psychological well-being. Trauma, such as physical, sexual, or emotional abuse, neglect, or exposure to violence, can disrupt an individual's cognitive, emotional, and behavioral functioning, and can alter their sense of self and their ability to form healthy relationships. It can cause changes in an individual's brain chemistry and structure, leading to changes in their emotional regulation, impulsivity, and decision-making abilities.

When an individual experiences trauma, they may develop maladaptive coping mechanisms to deal with its overwhelming emotional impact. These coping mechanisms can include avoidance, denial, and dissociation, which can prevent the individual from processing their traumatic experiences and seeking appropriate help. When these coping mechanisms become maladaptive and persistent, they can lead to the development of certain personality disorders. [100]

Trauma can be a risk factor for the development of certain types of personality disorders, but it is not the sole cause. A combination of genetic, environmental, and psychological factors contributes to their development.

Personality disorders are characterized by a pattern of maladaptive thoughts, feelings, and behaviors that deviate from cultural norms and expectations. Trauma can increase the risk of developing personality disorders by causing changes in the individual's cognitive, emotional, and behavioral functioning. These patterns are inflexible, pervasive, and stable over time, and they can lead to significant impairment in personal and social functioning. [100]

Trauma, particularly childhood trauma such as neglect or abuse, has been linked to the development of borderline personality disorder (BDP).

BPD is characterized by a pattern of instability in self-image, moods, and relationships, and may include impulsive behaviors, self-harm, and suicidal ideation. These individuals may have developed maladaptive coping mechanisms such as emotional dysregulation, impulsivity, and self-harm as a way to deal with the overwhelming emotional impact of their trauma.

A traumatic injury, such as a severe brain injury, can contribute to the development of the Personality Change Due to Another Medical Condition. Traumatic brain injuries can cause damage to specific areas of the brain that control personality, emotions, and behavior. This can result in changes in the individual's personality, such as increased impulsivity or irritability, or difficulty with empathy or emotional regulation. Additionally, traumatic injuries can also lead to other medical conditions that may contribute to personality change. It's important to note that the other mental disorders must be ruled out and that the personality change must be a direct consequence of a physical condition. [100]

Individuals who have experienced trauma may develop Post-Traumatic Stress Disorder (PTSD) and may also develop certain personality disorders characterized by anxious or fearful patterns of thinking, feeling, and behaving, such as Paranoid Personality Disorder, Dependent Personality Disorder, Avoidant Personality Disorder, and Obsessive-Compulsive Personality Disorder. These individuals may have developed maladaptive coping mechanisms such as avoidance, emotional numbing, and hypervigilance as a way to deal with the overwhelming emotional impact of the trauma.

Individuals with dependent personality disorder have a strong need to be taken care of and fear separation, which can be exacerbated by traumatic experiences. Trauma, can lead to feelings of helplessness and insecurity, which can cause an individual to look to others to meet their emotional and physical needs. Additionally, if an individual has experienced trauma, they may have developed maladaptive coping mechanisms, like clinging to others, which can become a defining characteristic of the disorder.

Trauma can lead to the development of paranoid personality disorder, by steering an individual to feel constantly on guard and to distrust others, which are both symptoms of the disorder. [100]

Trauma can also contribute to the development of avoidant personality disorder by damaging an individual's self-esteem and sense of trust in others. This can lead to feelings of inadequacy, social inhibition, and a fear of rejection or ridicule. As a result, individuals with avoidant personality disorder may avoid social interactions and activities, and have difficulty forming and maintaining close relationships.

Trauma can contribute to the development of Obsessive Compulsive Personality Disorder by affecting an individual's ability to regulate their emotions, thoughts, and behaviors. It can lead to the formation of negative thought patterns and beliefs, which can in turn lead to the development of compulsive behaviors that are intended to reduce anxiety, uncertainty and provide a sense of control. Additionally, trauma can also lead to the development of rigid and inflexible thought patterns, which can result in difficulties in relating to others, and a focus on orderliness, perfectionism, and control, that are hallmarks of the disorder.

Experiencing abuse or neglect during childhood can contribute as well to the development of antisocial personality disorder in several ways.

Trauma can affect the normal development of the brain, particularly in regions involved in regulating emotions, impulse control, and social behavior. This can make it more difficult for an individual to control their impulses and behavior, and to form healthy relationships with others.

It can also lead to the development of negative thought patterns and beliefs, such as a sense of mistrust or cynicism towards others, which can further fuel the development of antisocial behaviors.

It is important to note that not every individual who experiences trauma will develop a personality disorder, and other factors such as genetics, biology, and environment also play a role in the development of these disorders. However, research has shown that experiencing trauma increases the risk of developing personality disorders, but the relationship between trauma and personality disorders is complex and not fully understood by the scientific community. [100]



Chapter three: Mental health factors



The World Health Organization refers to mental health as a state of well-being in which a person is aware of his abilities, can be fulfilled, overcome the normal stresses of life, work in a productive manner and contribute to his community. [102]

it is more than the absence of illness. A person with a mental disorder can achieve a healthy mental state, and a person without a diagnosed disorder can experience great psychological suffering.

Each person has their own biological, psychological and social determinants that structure the unity of their personality. Some make them vulnerable, others make them resilient in the face of potential health issues, either physical or psychological.

Each one of these characteristics exist in multiple contexts. Numerous risk and protective factors operate within each of these contexts. These factors can influence one another as well.

I-Biophysical factors

1-Family history and genetics:

Biology and family history play a main role in people's mental strength throughout their lives. They may be genetically predisposed to psychiatric disorders like anxiety or depression [113,114]. If a family relative has fought with psychiatric challenges, it can increase the possibility that the next generation will struggle as well. It may be seen as a genetic vulnerability, meaning that a person may be more likely to develop that condition due to their genetic makeup. Researchers are still working to understand the specific genes and genetic mechanisms that may be involved in the development of mental health conditions. However, it's important to note that genetics are just one piece of the puzzle when it comes to mental health. Family history doesn't only concern genetics. The environment a person grows up in can also have an impact on their mental health [113,114]. Individuals who grow up in a household where there is a lot of conflict or abuse, they may be more likely to develop mental health issues as

a result of their experiences. While others who grow up in a supportive and nurturing environment, they may be less likely to develop mental health issues. Additionally, the way that a family approaches and deals with mental health can also have an impact. If a family is open and supportive when it comes to discussing mental health and seeking help when needed, a person may be more likely to feel comfortable seeking help for their own mental health condition. These simple spontaneous behaviors can model techniques to cope with stress and to manage mental health struggles. [113,114]

Studies has proved that learning healthy coping and self-care methods earlier in life can lessen the effect of mental health problems over the course of life. [115]

2-Physical illness:

Diseases and injuries often play a part in poor mental health and occasionally mental disorders [116]. Some chronic conditions such as diabetes, or physical impairment, such as traumatic brain injury and fracture-induced disabilities can directly influence brain chemistry and put mental health at risk. [117] Having a chronic illness or disability can be a very challenging and stressful experience, and it is not uncommon for people in these situations to experience mental health issues as a result. Managing its physical symptoms can be difficult and time-consuming. Individuals with chronic pain may struggle with feelings of frustration, hopelessness, and depression. [117] It often requires making significant changes to one's lifestyle, such as adapting to a new diet, taking medications, or changing work or living arrangements. These changes can be difficult to adjust to, and can lead to feelings of stress, anxiety, and loss. Dealing with the impact on daily activities can be so difficult, given it is directly linked to the person's ability to do the things they enjoy and participate in their usual activities. This can lead to feelings of isolation, frustration, and a loss of purpose. [117]

People with chronic illness or disability may face stigma and discrimination from others. This might include being treated unfairly or differently due to their condition, or feeling like they are not fully accepted or understood by others. Impaired physical health can contribute to low self-esteem and affect people's ability to reach their goals, which leads to sadness or even depression. [117]

3-History of alcohol or drug use:

A history of alcohol or drug use can have significant and lasting implications for an individual's mental health. It holds an increased risk of developing a substance use disorder since individuals who have such a history are at a higher risk of developing an addiction to that substance or another one in the future. Alcohol and drug addiction are considered to be mental health disorders because they involve the chronic dysfunction of the brain's reward, motivation, and stress-response systems. These disorders are characterized by compulsive substance use despite the negative consequences it may cause to an individual's physical and mental health, relationships, and overall functioning. It can also worsen existing mental health conditions, such as depression or anxiety, and make it more difficult for a person to receive proper treatment as substance abuse can interfere with the effectiveness of medications and other treatment approaches.

Substance use can lead to a wide range of physical health problems, including organ damage, increased risk of infection, and an increased risk of accidents and injuries. It can also lead to a wide range of mental health problems, including anxiety, depression, psychosis, and personality disorders. Additionally, substance use leads to a wide range of negative life experiences, such as financial problems, relationship difficulties, and legal issues, mostly due to impaired social and cognitive functions, such as decision making, memory and learning skills.

When a person with a substance use disorder stops using drugs or alcohol, they may experience withdrawal symptoms, which can include physical symptoms such as tremors and nausea, as well as mental health symptoms like anxiety, depression, and psychosis. These experiences can be very stressful and can contribute to the development or worsening of mental health problems. [118,119,120]

4-Nutrition and sleep:

Nutrition and sleep play important roles in maintaining good mental health.

A healthy, well-proportioned diet is crucial for the proper functioning of the brain and the production of neurotransmitters, which are chemicals that help regulate mood and other mental processes [109]. Eating a well-balanced diet that includes a variety of fruits, vegetables, whole grains, lean proteins, and healthy fats can help support mental health by providing the necessary building blocks for the brain to function optimally. Lack of proper nutrition can lead to deficiencies that can affect mood, energy levels, and cognitive function [109,111].

Sleep is also essential for mental health. Getting enough sleep helps to regulate mood, improve cognitive function, and reduce stress levels. A lack of sleep can lead to irritability, anxiety, and depression, as well as impacting memory, attention, and overall cognitive function. Adequate sleep is important for overall well-being and maintaining good mental health. [111]

5-Physical activity:

Physical activity can be a powerful tool in promoting and maintaining good mental health. Regular exercise has been shown to reduce symptoms of depression and anxiety, improve mood, and increase feelings of well-being.

Physical activity can also help to improve sleep, which can be beneficial for people experiencing stress or mental health conditions. Additionally, it can help to reduce stress by releasing endorphins, which are chemicals in the brain that act as

natural painkillers and mood elevators. [112] Physical exercise can also have a positive impact on cognitive function, such as memory and learning, by increasing blood flow to the brain and promoting neuroplasticity [110]. It can take many forms, from structured exercise programs, such as weightlifting or running, to more leisurely activities, such as gardening or going for a walk. It is important for individuals to find an enjoyable activity that they can stick to in the long term, as consistency is key to reaping the mental health benefits of physical activity. [112]

II-Psychological factors

1-Prolonged and repeated trauma:

A history of trauma refers to experiences of traumatic events in an individual's past that can have a significant impact on their mental health and well-being. Trauma can take many forms, including physical, emotional, sexual, or psychological abuse, neglect, accidents, natural disasters, war, or other forms of violence. Individuals who have such a history may experience a range of mental health issues, including depression, anxiety, post-traumatic stress disorder (PTSD), and especially complex post-traumatic stress disorder. They may also have difficulty trusting others, maintaining healthy relationships, and managing their emotions. Trauma can also lead to the development of maladaptive coping mechanisms, such as substance abuse, self-harm, or eating disorders, which can further complicate an individual's mental health. Trauma victims notice themselves trapped in hazardous environments where they can literally relive the trauma over and over again, re-victimized without an end point, increasing the risk to develop severe and resistant psychiatric disorders. Nowadays, therapists commit themselves on supplying trauma victims with a safe haven where their healing process could begin. [121]

2-Low self-esteem and self-confidence:

Self-esteem is a person's overall sense of self-worth or personal value. It is the way we perceive ourselves and how we feel about ourselves. People with healthy self-esteem have a positive view of themselves and their abilities, while those with low self-esteem may have negative thoughts and feelings about themselves, and are more inclined to lead unhappy and unsatisfied lives. Self-esteem can be influenced by a variety of factors, including past experiences, societal influences, and personal beliefs.

Low self-esteem can lead to a variety of mental health issues, such as depression, anxiety, and poor self-worth. It can also affect a person's ability to form and maintain healthy relationships, as well as their ability to make positive life choices. It is also linked to poor academic or job performance.

On the other hand, High self-esteem can be beneficial to mental health, as it is associated with greater resilience, better coping skills, and a more positive outlook on life. People with high self-esteem are more likely to set and achieve goals, and to be confident in their abilities. [122,123,124]

It is important to note that self-esteem is not a fixed trait and can change over time based on different experiences, interactions and even thoughts.

3-Pessimism:

Pessimism is a personality trait in which a person has a non-balanced, more negative than positive, view of life. It can have a significant negative impact on mental health. [122,123,124]

People who tend to have a pessimistic outlook on life are likely to have less support systems, reduced resilience, ineffective coping mechanism to deal with stress, a better inclination for depression and anxiety disorders, and may be more likely to give up in the face of challenges.

Pessimism can also affect relationships. Pessimistic individuals may have a harder time forming and maintaining close relationships, as their negative outlook can make them less likely to trust others and more likely to engage in conflicts. Additionally, pessimism tends to make stressful challenges even more unpleasant.

4-Temperament and personality traits:

Temperament is thought to be influenced by genetics and biology, and it refers to an individual's natural disposition or "style" of responding to their environment. The differences in temperament can affect how an individual respond to stressors and challenges, and can also affect the development of certain mental health conditions. Individuals with a temperament that is naturally anxious may be more prone to developing anxiety disorders, while others with a temperament that is naturally resilient may be better able to cope with stress. [122,123,124]

Personality, on the other hand, is thought to be influenced by both genetics and environment, and it refers to the way in which an individual's temperament is shaped by their experiences, learning, and cultural influences. Personality traits, such as extraversion, conscientiousness, and neuroticism, can affect how a person thinks, feels, and behaves in different situations. These traits can also interact with environmental factors to influence the development and expression of mental health conditions.

Individuals with a high level of neuroticism may be more susceptible to developing depression in response to a traumatic event, while others with a high level of conscientiousness may be less likely to develop substance use disorders. It's worth noting that both temperament and personality are continuous dimensions, meaning that people can fall anywhere on a spectrum, and different individuals may have different levels of different traits. Additionally, both temperament and personality can change over time, and can be influenced by a variety of factors such as life experiences, education, and therapy. [122,123,124]

III-Social factors

1-Adverse childhood experiences:

Adverse childhood experiences (ACEs) refer to traumatic events that occur during childhood, such as physical, emotional, or sexual abuse, neglect, or household dysfunction. [125]

Research has shown that the more ACEs an individual has experienced, the greater their risk for developing mental health problems. In particular, ACEs have been linked to an increased risk for developing post-traumatic stress disorder (PTSD). [107]

ACEs can disrupt the development of the brain, leading to changes in the way the brain processes and responds to stress. This can make it more difficult for individuals who have experienced ACEs to regulate their emotions, leading to an increased risk of mental health conditions such as anxiety and depression. [103,104,105,106]

Additionally, they can have a profound impact on the development of an individual's brain and body. The stress of experiencing traumatic events during childhood can cause changes in the way the body responds to stress, which can lead to long-term health problems, such as high blood pressure.

Furthermore, ACEs can also lead to changes in the way an individual forms and maintains relationships [107]. Children who have experienced ACEs may struggle to trust others, leading to difficulties in forming and maintaining healthy relationships in adulthood, which can have a negative impact on mental health.

2-Social gradient:

The social gradient in mental health refers to the observation that individuals with lower socioeconomic status (SES) tend to have worse mental health outcomes than those with higher SES. This relationship is often described as a "gradient" because the difference in mental health outcomes tends to increase as SES decreases. [103,104,105,106]

Individuals with lower SES may be exposed to more adverse childhood experiences, which are associated with poor mental health outcomes in adulthood. They may also have less access to mental health resources and support. This can include things like healthcare, therapy, and medication, all of which can be important for managing mental health conditions.

They may also be exposed to more stressors, such as unemployment, poverty, and discrimination. These stressors can take a toll on mental health, leading to higher rates of depression, anxiety, and other mental health disorders. [103,104,105,106]

It's worth noting that the social gradient in mental health is not limited to low SES populations, but it's more prevalent among them. Furthermore, the social gradient in mental health is not unique to any particular country, but it is a global phenomenon.

3-Unemployment:

Unemployment can have a significant negative impact on mental health and well-being, as it can lead to a range of negative emotions and stressors that can be difficult to cope with. Being out of work can lead to feelings of hopelessness, worthlessness, and isolation. It can also cause financial stress and strain on relationships. Long-term unemployment in particular can lead to a loss of identity and a sense of purpose, as an individual's job often plays a significant role in their sense of self. It has been linked to an increased risk of depression, anxiety, and suicide. [103,104,105,106]

Loss of income and the associated financial stress can lead to a lack of access to basic needs such as food, housing, and healthcare, which can further exacerbate mental health issues. This can lead to feelings of hopelessness and helplessness. Additionally, people living in poverty often face discrimination, stigma, and social isolation, all of which can contribute to poor mental health. In terms of children, the effects of poverty on mental health can be particularly damaging. They would be at a higher risk for behavioral and emotional problems, as well as developmental delays. They may have less access to quality education, which can negatively impact their cognitive development and future opportunities.

Furthermore, the loss of a job can also lead to a loss of social connections and a sense of identity, which can contribute to feelings of isolation and low self-esteem, which can further exacerbate mental health problems.

Additionally, the job searching process can also be a source of stress. The constant rejection, uncertainty and the pressure to find a job can take a toll on one's mental health. The pressure to find work can be especially difficult for those who have been unemployed for an extended period of time, as they may begin to feel like they are not good enough or that they are not valued in the workforce. [103,104,105,106]

4-Support systems:

Support systems refer to the various sources of support that individuals have in their lives, including family, friends, community, and professional resources [108]. These systems can play a critical role in promoting mental health and well-being by providing emotional support, practical assistance, and a sense of belonging and connectedness. In terms of emotional support, having a strong support system can help individuals to cope with stress, anxiety, and depression by providing a sounding board for their feelings and experiences. Friends and family members can offer validation, encouragement, and understanding, while professionals such as therapists or support groups can provide a more structured form of emotional support.

Practical support can include help with daily tasks, such as childcare or transportation, as well as financial assistance. This type of support can help to reduce stress and improve overall well-being by removing some of the everyday burdens that can contribute to mental health issues.

Having a sense of belonging and connectedness is also an important aspect of a support system [108]. This can be provided by family and friends, religious or community groups, or other organizations. Being part of a group or community can provide a sense of purpose, and can also help to reduce feelings of isolation and loneliness. [103,104,105,106]

Overall, support systems can play a vital role in promoting mental health and well-being by providing emotional, practical, and social support. They can help individuals to cope with stress, anxiety, and depression, and can provide a sense of belonging and connectedness. It's important to have a balance of different types of support and to recognize that different types of support may be needed at different times. [103,104,105,106]

IV-Religious and spiritual factors

Religious and spiritual beliefs are both embedded in trying to comprehend the purpose of life and, how a connection with a divine and higher power may determine that purpose [126]. They can play a significant role in an individual's mental health. For some people, these beliefs provide a sense of purpose and meaning, and can serve as a source of comfort and support during difficult times [126]. They can also provide a sense of community and belonging, by giving people an entity to depend on and believe in, and generally providing them with a congregation with whom the same beliefs are shared. All of which can be beneficial for mental health.

However, religious and spiritual beliefs can also contribute to mental health problems if they are used to justify harmful behaviors or if they are used to dismiss the importance of seeking professional help.

Additionally, some research suggests that religious and spiritual practices, such as meditation and prayer, may have positive effects on mental health, such as reducing stress, anxiety and depression, by generating harmony, peace and forgiveness. [126]

It is important to note that religious and spiritual beliefs can interact with mental health in complex ways and that each individual's experience is unique. However, not everyone has such beliefs, and that is also valid. A person's mental health should be evaluated and treated based on their individual needs and experiences, regardless of their religious or spiritual beliefs. [126]



Chapter four: Trauma psychiatric management



I-Early assessment and detection

Beyond the physical injuries, It's clear that the psychiatric morbidity specifies the functional prognosis, both mentally and physically. [136]

The period following a major trauma injury currently arouses interest and questions in the fields of clinical research and psychiatric care.

It is poorly known, both from the point of view of the intervention to be expected from professionals, and from the way in which it is experienced by the patient and his entourage. It nevertheless constitutes a probable crucial moment, where the border between normal and pathological can be crossed, hence an early assessment of the patient's psychiatric state would be so beneficial for his or her well-being.

The need to better understand the different types of physical injuries, their most probable consequences, the patient's personality traits and pre-trauma psychiatric state is required during the establishment of a network for early intervention of trauma-related psychiatric disorders. But more broadly, the broadcasting of the idea of early assessment, the increased solicitation of psychiatric teams regarding at-risk people represent all the reasons that should encourage the medical field to collect more data on this specific situation and to analyze its challenges. [136]

1-Screening for disorder:

Since the majority of trauma patients recover without persistent psychological problems, it has been reported that providing trauma intervention to all individuals who have experienced a traumatic event may not be practical, or even ethical [137].

The National Collaborating Centre for Mental Health (NCCMH) recommends that a routinely applied single session approach to all trauma patients is unlikely to have a significant effect on the prognosis [138].

Instead, targeting intervention to specific individuals, rather than providing a one-size-fits-all approach, may be more beneficial by focusing on individuals who show signs of developing post-trauma psychopathology.

Screening is crucial in identifying those who may benefit from intervention, and there are two main types of screening: screening for existing disorders and screening for potential future disorders. [136]

There has been a significant amount of research focused on creating screening tools to identify trauma patients with PTSD. 13 screens with 30 or fewer items that have been validated against structured clinical interviews, have been developed in a study [139]. It has been concluded in this study that simpler screens with fewer items, easy scoring methods, and straightforward response scales are as effective as more complex scales.

The Impact of Event Scale (IES) and the Trauma Screening Questionnaire (TSQ) have been shown to be reliable and validated on multiple independent samples [140,141]. It is worth noting that these measures were administered some time after the traumatic experience and did identify symptoms that have emerged over a period of weeks or months. [136]

There has been significant attention given to the use of screening tools to detect depression as well. These tools include well-validated questionnaires like the Hospital Anxiety and Depression Scale (HADS), shortened versions of questionnaires like the Beck Depression Inventory for Primary Care (BDIPC), and even asking a single question about mood [142,143,144].

According to Schade, Jones, and Wittlin (1998), screening instruments are often more effective than clinician judgment and perform as well as more extensive questionnaires [145]. In a review of primary care studies, Williams, Hitchcock Noel, Cordes, Ramirez, and Pignone (2002) also found that depression screening instruments with 1-30 items had reasonable accuracy when diagnoses were verified using structured clinical interviews. [146]

Zimmerman and Mattia (2001) conducted a study on psychiatric outpatients and found that the Psychiatric Diagnostic Screening Questionnaire (PDSQ) is a reliable tool for identifying anxiety disorders when compared to the Structured Clinical Interview for DSM Disorders [147]. Balon (2005) also found that screening tools specifically designed to assess a particular anxiety disorder can be useful [148].

However, it is important to note that screening instruments for anxiety and depression often lack the ability to differentiate between the two disorders and may simply measure the general presence of either anxiety or depression [149].

To address this issue, the Anxiety and Depression Detector has been developed as a tool that can effectively identify specific disorders as well as assess general distress that could indicate the presence of any anxiety or depression disorder [150].

While there is some evidence supporting the usefulness of certain measures as screening tools for anxiety and depression, further research is needed to determine their effectiveness in different settings.

2-Screening for vulnerability:

This form of screening after trauma is important to identify those at risk for poor psychological recovery and developing PTSD. While it is crucial to screen for PTSD at least one month after the traumatic event (time criterion), screening for vulnerability earlier can help identify those at risk [136]. A number of studies have used self-report measures such as the Stanford Acute Stress Reaction Questionnaire (SASRQ) and the Acute Stress Disorder Scale, as well as structured clinical interviews like the Acute Stress Disorder Interview, to identify individuals at high risk for developing PTSD [136]. These studies have generally found that while a high proportion of those with an acute stress disorder diagnosis go on to develop PTSD, a large number of individuals who develop PTSD do not have an acute stress disorder (ASD) diagnosis, possibly due to the low sensitivity of dissociative symptoms [151,152].

Creamer (2005) found that the acute arousal and re-experiencing clusters of ASD symptoms had the highest sensitivity and were the strongest predictors of both a categorical PTSD diagnosis and the severity of PTSD [151].

Meta-analyses by Brewin et al. (2000) and Ozer et al. (2003) have identified that several factors can increase an individual's risk for PTSD, including psychiatric history, childhood abuse, and family psychiatric history [153,154]. Although some predictors may vary depending on the population being studied.

It is well-established that the severity of acute post-traumatic symptoms is a strong predictor of later risk for PTSD [155,156]. However, it is worth noting that incorporating other pre-trauma, peri-trauma, and post-trauma variables can improve the accuracy of predictive models. This is also the case when predicting post-traumatic depression. [156]

Some screening tools, such as the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI), have high sensitivity but only modest specificity. These instruments also tend to have high negative predictive power, meaning they are effective at identifying those who will not develop post-traumatic psychopathology. [136]

In order to improve our ability to predict vulnerability to later psychopathology, future research should focus on developing predictive screening tools that take into account current symptom levels and known vulnerability factors, such as a history of prior trauma or psychopathology.

II-Early intervention

The psychiatric morbidity of major trauma patients emphasizes the determining character of early intervention for patients who experience the first symptoms and warning signs of a trauma-related psychiatric disorder.

The period that follows the trauma is a period of significant great changes, both physiologically and psychologically. It is a period of fragility and at-risk for the emergence of various psychiatric disorders: trauma and stress related disorders, anxiety disorders, mood disorders, addiction and sleep disorders.

It is also a period associated with great plasticity, great capacity for recovery, and especially great resilience. [136]

Therefore, early intervention can considerably improve the quality of physical and psychiatric recovery, and even prevent progression to sever forms in these secondary disorders. [136]

It is based on certain essential principles: promotion, commitment, assessment and rapid integration of the appropriate interventions.

Its programs need to be seeking to reduce the time to access appropriate care for people at-risk or for those going through the early stages of a mental disorder. On the other hand, it needs to maximize recovery chances by relying on bio-psycho-social interventions adapted to each patient's needs and their disorder's phase, whose effectiveness should always be evaluated by easily accessible multidisciplinary specialized teams, whose job will be to train psychiatric care professionals and their networks in better detection and interventions. [136]

1-Acute stress disorder and post-traumatic stress disorder management:

1-1-Psychotherapy:

A-Cognitive behavioral therapy:

Cognitive Behavioral Therapy (CBT) is a type of psychotherapy that focuses on the relationship between thoughts, feelings, and behaviors. The idea behind CBT is that an individual's thoughts and beliefs influence his emotions and actions, and by changing these thoughts and beliefs, it's possible to change his emotional and behavioral responses [157,158]. It is goal-oriented, structured, and focused on the individual's current problems, while taking into account what triggered them. CBT help to gradually overcome the disabling symptoms and aim to reinforce adapted behaviors. It relies on different techniques that help the person to identify the mechanism at the origin of his difficulties, to experiment new behaviors and thus gradually get out of vicious circles that perpetuate and aggravate psychological suffering.

Functional analysis represents a key step of CBT. It allows to explore with the patient what happens during difficult times (anxiety crisis, emotional distress...) and, in particular, how his emotions, thoughts and behaviors are getting stronger. The therapist and patient work together to identify and challenge negative or irrational thoughts, and to develop more positive and realistic ways of thinking. This step makes it possible to identify the problematic behaviors, to consider the tools and goals to be achieved, as well as the appropriate therapeutic strategy. This essential step is carried out at the beginning of therapy and can be reconsidered at any time, in the face of new problematic behaviors or in the event of difficulties or blockages during therapy. [157,158]

CBT also includes techniques to help the client change their behavior and learn new healthier coping mechanisms.

It has been found to be highly effective in treating a wide range of mental health conditions, especially ASD and PTSD [157,158]. It has also been used to treat chronic pain, insomnia, and substance use disorders. It is considered a "gold standard" treatment for many mental health conditions, and is often recommended as a first-line treatment by mental health professionals. Exposure therapy is a type of cognitive-behavioral therapy that is used to treat trauma and stress related disorders. The therapy involves gradually exposing the patient to the source of their fear or anxiety in a controlled and safe environment, in order to help them learn to cope with and eventually overcome their fear or anxiety. The goal of exposure therapy is to help the patient learn that the feared object or situation is not actually dangerous, and to reduce or eliminate the negative emotional response associated with the fear or anxiety. This can be done through a variety of techniques, such as in-vivo exposure (exposure to real-life situations), imaginal exposure (exposure to imagined situations), and virtual reality exposure therapy.

Exposure therapy is based on the principles of classical and operant conditioning, which suggest that the more an individual is exposed to a feared stimulus, the less afraid they will become of it. [157,158]

The therapist will work with the patient to create a treatment plan, and will gradually increase the level of difficulty of the exposure exercises as the patient becomes more comfortable. Some people may experience some discomfort or anxiety during exposure therapy, but this is considered to be a normal part of the process and is expected to decrease over time as the patient becomes more comfortable with the feared stimulus.

B-Eye movement desensitization and reprocessing:

Eye Movement Desensitization and Reprocessing (EMDR) is a form of psychotherapy that was developed to treat post-traumatic stress disorder (PTSD) and other mental health conditions [159]. EMDR is a technique that uses eye movements

to act on neurological functioning and the brain's ability to process information in order to reduce the psychological distress associated with upsetting memories, and to prevent them from getting reactivated when the subject reminisces about the event. The therapy is based on the idea that traumatic memories are stored in the brain differently than normal memories, and that by reliving the traumatic event while simultaneously engaging in a specific type of eye movement, the memory can be processed and integrated into the individual's overall life experiences. In other words, this approach seems to stimulate the brain so that it metabolizes or digests the dysfunctional residues of one's traumatic past. [159] During an EMDR session, a therapist will guide the individual through the traumatic event while they engage in a specific type of eye movement, such as following the therapist's finger as it moves back and forth or listening to a series of tones that alternate between the left and right ear. The eyes must follow the movement of the therapist's finger while the head remain fixated. The rhythmic movement of both eyes would be equivalent to the one that occurs spontaneously during dreams [159]. The individual is then encouraged to let their mind wander and to pay attention to any thoughts, feelings, or images that come to mind. The therapist will then help the individual process and make sense of the thoughts and feelings that come up during the session. The images, the perceptions and memories that were negatively coded are literally recoded as they lose their intensity. As if gradually the harmful elements were shed from the brain to be replaced by harmless elements. EMDR showed great efficiency in treating patients with PTSD [159], since this approach is known to work better with patients suffering from a well identified trauma (dog phobia after experiencing a dog bite), rather than a disorder whose starting point is unknown (a dog phobia since birth). It has been shown to be effective in reducing symptoms of PTSD, as well as other mental health conditions such as anxiety, depression, and phobias. [159]

1-2-Pharmacotherapy:

With PTSD, the brain has suffered some changes that push the body to respond differently to stress. The brain cells aren't able to communicate as well as they should. [160]

Medications that balance the levels of certain chemical signals have been shown to help, a number of which has shown to work best for PTSD.

The first line of treatment in term of medication are referred to as anti-depressant. They are prescribed for depression, anxiety, irritability and PTSD.

A number of anti-depressants have shown their efficiency against this disorder, such as Selective Serotonin Reuptake Inhibitors (SSRI) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRI).

The best tested and proven SSRIs for PTSD are Sertraline, Paroxetine and Fluoxetine. While the best proven SNRI is Venlafaxine.

All four of these medications can improve PTSD symptoms, making them less bothersome so that the patient can overcome his condition more successfully. Although anti-depressants for PTSD usually take some time to work and show their efficiency. It would take about four to six weeks before the patient feels the full benefits of the medication. [157,160]

1-3-Prevention:

Acute Stress Disorder exhibits similar characteristics to PTSD and can be diagnosed within 3 days to a month after a traumatic event. It is considered a strong predictor of PTSD [166]. To minimize the negative impact of traumatic stress, there is a need for therapies to prevent acute stress reactions from turning into chronic PTSD, particularly for high-risk individuals. Some psychological prevention methods for PTSD have proven to be ineffective [167], while others like psychological debriefing after trauma may even cause harm [168]. Trauma-focused Cognitive Behavioral Therapy has shown promise in treating individuals with acute traumatic stress

symptoms, and early research on Prolonged Exposure Therapy in the aftermath of trauma suggests it may reduce post-traumatic stress reactions [169]. However, limited evidence on treatments combining both psychological and pharmacological approaches have not yet shown significant benefits [170]. With advancements in our understanding of the neurobiology of PTSD, there's a growing interest in using drugs to prevent its onset. Research has found that memory consolidation during the first 6 hours after a traumatic event is particularly susceptible to disruption [171], leading to the focus on these "golden hours" and beyond as a potential target for pharmacological treatment [172]. Two main pharmaceutical options investigated for preventing PTSD after a traumatic experience are hydrocortisone and beta-blockers like propranolol. Low cortisol levels have been linked to PTSD in trauma patients [161], leading to the hypothesis that administering hydrocortisone soon after a traumatic event may lower PTSD risk. Propranolol has shown the ability to block traumatic memory consolidation in preclinical studies, potentially reducing PTSD risk. However, small randomized trials have not shown a preventive effect for propranolol after trauma exposure [162,163]. While there is some preliminary evidence for hydrocortisone's positive impact on PTSD prevention, other drugs like serotonin inhibitors, temazepam, gabapentin, albuterol, morphine, and oxytocin have not yet been supported by strong evidence. [162,164,165]

2-Substance use management

2-1-Rehabilitation approaches:

The management of a substance use disorder depends on the specific substance involved and the severity of the disorder.

However, in general, treatment may include a combination of the following:

-Medications: Different medications may be used to treat different substance use disorders. For example, naltrexone is a medication that can be used to treat alcohol use disorder and opioid use disorder. [173]

It works by blocking the effects of these substances and can help reduce cravings. Other medications, such as disulfiram and acamprosate, can be used to treat alcohol use disorder and work by modifying the way alcohol is metabolized in the body, which can help minimize cravings and the risk of relapse [174].

-Therapy: Therapy can help individuals with a substance use disorder understand the underlying causes of their substance use and develop coping skills to manage triggers and cravings.

Some common therapies used to treat substance use disorders include cognitive-behavioral therapy, motivational interviewing, and contingency management. [175]

-Support groups: Support groups are a key component of recovery for many individuals with a substance use disorder. These groups provide a sense of community and accountability, as well as a safe space to share experiences and struggles. Examples of support groups include Alcoholics Anonymous (AA), Narcotics Anonymous (NA)...

-Rehabilitation programs: Rehabilitation programs, also known as "rehab," provide a strict structured and supportive environment in which individuals can focus on their recovery without the possibility of surrendering to cravings. These programs can vary in length and intensity, and may include therapy, support groups, medical care, and other services.

-Holistic treatments: Holistic treatments are alternative or complementary approaches to treatment that focus on the whole person, rather than just the substance use disorder. Some people may find relief from their substance use disorder through holistic treatments such as acupuncture, massage, or yoga. These treatments may be used in conjunction with more traditional approaches, such as medication and therapy [175].

It's important to note that recovery from a substance use disorder is a long-term process and often requires ongoing treatment and support. The specific treatment plan will depend on the individual's needs and circumstances.

2-2-Selective preventive interventions [176]:

They are targeted at individuals who are at a higher risk for developing a substance use disorder, but who do not yet have one.

These interventions are designed to prevent the onset of substance use disorders by addressing the factors that increase their risk.

-Educational programs: they are designed to provide individuals with information about the risks and consequences of substance use. These programs may be delivered in a variety of settings, including schools, community centers, and healthcare facilities. Educational programs may include lectures, group discussions, and interactive activities that teach individuals about the effects of different substances on the body and the risks associated with substance use.

-Skills training programs: they are designed to teach individuals the skills they need to cope with stress, manage their emotions, and handle difficult situations without turning to substance use. These programs include techniques such as relaxation training, problem-solving and communication skills.

-Family-based interventions: Family-based interventions are designed to help families identify and change behaviors and communication patterns that may contribute to a child's substance use risk. These interventions may include individual and family counseling, as well as parent training programs that teach parents how to set limits, communicate effectively, and model healthy behaviors for their children.

-Individual counseling: it can help individuals identify and address the factors that increase their risk of developing a substance use disorder and develop strategies to reduce that risk. This may involve helping individuals explore their motivations for substance use, identify their triggers and coping skills, and develop a plan for managing cravings and avoiding substance use.

2-3-Indicated preventive interventions [176]:

These interventions are targeted at individuals who are at risk of developing a substance use disorder and are already experiencing some negative consequences of substance use, but do not meet the criteria for a substance use disorder. These interventions are designed to prevent the development of a more severe substance use disorder by addressing the factors that increase their risk and reducing the negative consequences of substance use.

There are several types of indicated preventive interventions, including:

-Brief interventions: Short, structured interventions that are designed to motivate individuals to change their substance use behaviors and reduce their risk of developing a substance use disorder. These interventions may be delivered in a variety of settings, including primary care clinics, emergency departments, and schools.

-Motivational interviewing: Motivational interviewing is a counseling approach that is designed to help individuals identify and resolve their ambivalence about changing their substance use behaviors. This approach involves exploring an individual's motivations for substance use, helping them to clarify their values and goals, and assisting them in developing a plan for change.

-Referral to treatment: For individuals who are at high risk of developing a substance use disorder or who are already experiencing significant negative consequences of substance use, referral to treatment may be indicated. Treatment options may include outpatient or inpatient rehabilitation programs, therapy, and medication-assisted treatment.

It's important to note that all these interventions are most effective when they are tailored to the individual's specific needs and circumstances. They may be delivered in a variety of settings, including primary care clinics, emergency departments, schools, and community centers.

3-Anxiety disorders management:

Psychotherapy is a type of therapy that involves talking with a mental health professional to understand and work through your feelings and behaviors. There are several different types of psychotherapy that can be used to treat anxiety disorders, including cognitive-behavioral therapy (CBT), which helps you identify and change negative thought patterns that contribute to your anxiety. Additionally, Medications for anxiety come in different forms, with SSRIs being commonly prescribed for Generalized Anxiety Disorder (GAD) and Panic Disorder (PD). Tricyclic antidepressants (TCAs), although better researched for PD, are believed to work for both GAD and PD. While TCAs are as effective as SSRIs in treating PD, they may cause adverse reactions, limiting their use in some cases. Venlafaxine XR is effective and well-tolerated for both GAD and PD. Duloxetine is only supported by evidence for its use in GAD. Azapirones, such as Buspar, show better results than a placebo in treating GAD, but are not effective for PD [177].

Titration of medication should proceed gradually to minimize initial stimulation. It's important to note that the onset of action may be delayed, and it may take up to 4 weeks of using the medication until the highest end of the dose range to determine its efficiency. Once improvement is seen, maintenance therapy for a year is recommended to prevent relapse, and some patients may require a longer duration of treatment. [177]

Benzodiazepines can efficiently manage anxiety, but the risk of tolerance, sedation, confusion, and elevated mortality increases with higher doses. When combined with antidepressants, benzodiazepines may lead to a quicker recovery from anxiety symptoms, but have no impact on long-term outcomes. However, their potential for dependence and negative side effects make their use challenging [178]. Beta blockers can help to reduce physical symptoms of anxiety, such as tachycardia.

Making certain changes to one's lifestyle can help to reduce anxiety, such as getting regular exercise, eating a healthy diet, and getting enough sleep.

There are some alternative therapies in which many people find relief from anxiety disorders such as acupuncture, massage, or herbal remedies.

4-Mood disorders management:

The earliest efficient treatments for depression were monoamine oxidase inhibitors (MAOIs) and TCAs. More recent antidepressants, including SSRIs, SNRIs, and some atypical ones like mirtazapine and nefazodone, have milder side effects but equal effectiveness compared to MAOIs and TCAs. All these drugs work by balancing serotonin and norepinephrine neurotransmission. This limited range of mechanisms might partially explain why current antidepressant treatments have limited success rates in treating major depression. [179]

Lithium was the first psychotropic drug with a designated use for treating bipolar disorder. Clinical trials have substantiated its effectiveness in managing acute mania, particularly in cases with classic symptoms like elevated mood and grandiosity. Its efficacy, however, may be reduced in cases of mixed states, frequent mood cycling, repeated episodes, or co-occurring substance abuse disorders. [179]

Lithium, along with valproic acid, and lamotrigine, help reduce the severity and frequency of mood swings in people with bipolar disorder.

Antipsychotics can also be helpful in treating severe depression and bipolar disorder, as well as psychosis. Traditional antipsychotic medications target dopamine D2 receptors and have been found to be effective in treating symptoms of acutely ill bipolar patients. Most of the atypical antipsychotics have been approved by the FDA for the treatment of bipolar mania. These medications may also be used in combination with other treatments or as a single therapy to alleviate symptoms of both bipolar depression and treatment-resistant major depression. [179]

Psychotherapy can help with identifying and changing negative thinking and behavior patterns. Cognitive-behavioral therapy (CBT) and Interpersonal therapy (IPT), which focuses on relationships and communication patterns, and can be helpful in improving social support and coping with life transitions. Electroconvulsive therapy (ECT) is a medical treatment that involves the use of electric current to stimulate the brain. It is typically used in severe cases of depression that have not responded to other treatments. [179] Finally, Complementary and alternative treatments such as acupuncture and meditation, making diet changes and exercising, while adopting good sleep habits can help improve the individual's mood and manage mood disorders.

5-Sleep disorders management:

For severely injured patients, managing sleep can be particularly challenging.

Starting with the patient's healthcare team, whose job is to identify and address any medical conditions or medications that may be contributing to sleep problems. They can also provide guidance on how to manage pain, which can be a major barrier to sleep for severely injured patients.

Techniques such as deep breathing, progressive muscle relaxation, or guided imagery can help with relaxation and prepare the individual for sleep.

Creating a conducive sleep environment is so fundamental given it allows the patient to be comfortable enough for sleep, by making sure the sleep environment is quiet, dark, and cool, while using comfortable mattress and pillows. Pharmacological management of sleep disorders typically involves the use of prescription sleep aids. Commonly used medications include Z-drugs, Benzodiazepines, Melatonin receptor agonists and Antidepressants.

Finally, establishing a consistent sleep routine has shown the most efficiency with trauma patients, by trying to go to bed and wake up at the same time every day, even on weekends, which helps regulate the body's natural sleep-wake cycle. It's

important to note that the specific strategies that will be most helpful for a severely injured patient will depend on their individual needs and circumstances. It may take some trial and error to determine the best approach. [180]

6-Personality disorders management:

CBT can help individuals understand the link between their thoughts, feelings, and behavior and can help them develop more effective coping strategies. It may also focus on helping individuals develop a more positive self-image and improve their self-esteem. Dialectical behavior therapy (DBT) is a form of therapy that is specifically designed to treat individuals with Borderline Personality Disorder. DBT combines cognitive-behavioral techniques with mindfulness and acceptance-based strategies to help individuals improve their emotional regulation and interpersonal relationships. DBT focuses on teaching individuals how to manage intense emotions in a healthy way and how to improve their communication and problem-solving skills. [181]

Trauma-focused therapy is a form of therapy that is specifically designed to address the traumatic event(s) that may have contributed to the development of the disorder. It may include techniques such as eye movement desensitization and reprocessing (EMDR) which can help process and integrate traumatic memories. This therapy may involve reliving the traumatic event in a safe and controlled environment and help the individual process their feelings and reactions. [181]

Medication can be used to address specific symptoms associated with trauma-related personality disorders. Antidepressants, such as selective serotonin reuptake inhibitors (SSRIs) may be prescribed to help manage symptoms of depression and anxiety. Antipsychotics, such as risperidone or olanzapine may be prescribed to help manage symptoms of paranoia or impulsivity. Mood stabilizers, such as lithium, may be prescribed to help manage symptoms of mood swings and impulsivity [181].

In some cases, hospitalization may be necessary to address severe symptoms or to provide a safe environment for the individual to receive treatment. This may be the case when an individual's symptoms are severe enough that they pose a danger to themselves or to others. Hospitalization allows for closer monitoring and management of symptoms, and it can provide a safe environment for the individual to receive treatment.

Supportive therapies such as art therapy, music therapy, and recreational therapy can be used to help individuals express and process their emotions. These therapies can provide a nonverbal outlet for individuals to express themselves and can help them process their feelings and reactions. Supportive therapies can also help individuals develop coping strategies and improve their overall emotional well-being.

Finally, joining a support group can be beneficial as it allows individuals to connect with others who have had similar experiences. Support groups can provide a sense of validation and understanding, which can be particularly helpful for individuals who have experienced trauma. Support groups can also provide a sense of community and belonging, which can be beneficial for individuals who have experienced trauma-related personality disorders.

III-Psychiatric follow-up

1-Clinical monitoring:

A psychiatric monitoring and evaluation is a process used by mental health professionals to identify the landmarks, symptoms or clues that reveal the ongoing development of the psychiatric disorder.

The information gathered during the follow-up makes it possible to plan the interventions specifically to the patient's condition, and it consists of establishing links between current and past data. [182-185]

It provides insight into specific clinical situations, includes clinical activities to monitor the evolution of the subject's mental and physical health, and helps detect any sign of imbalance to intervene effectively at the appropriate time.

-Clinical interview: During a clinical interview, a mental health professional will ask the individual questions about their symptoms, medical history, and overall functioning. The purpose of the interview is to gather as much information as possible about the individual's mental health and wellbeing.

-Mental status examination: it involves the mental health professional observing the individual's appearance, behavior, and cognition (thinking, memory, and judgment). The purpose of this examination is to assess the individual's current mental state and identify any abnormal behaviors or symptoms. [182-185]

-Psychological testing: Psychological testing may involve the use of standardized questionnaires or other tests to assess the individual's symptoms and functioning. These tests can provide valuable information about the individual's mental health and can help the professional determine the most appropriate course of treatment. [182-185]

-Physical examination: A physical examination is a routine medical examination that includes a review of the individual's medical history, measurement of vital signs (such as blood pressure and heart rate), and a general examination of the body. The purpose of a physical examination is to rule out any medical conditions that may be contributing to the individual's symptoms.

-Laboratory tests: Laboratory tests are used to gather more information about an individual's physical health and can help rule out any medical conditions, or a substance use that may be contributing to their symptoms. These tests may include blood work, urine tests...

2-Treatment monitoring:

Treatment monitoring refers to the ongoing evaluation of the effectiveness of a patient's treatment plan and the identification of any necessary adjustments. [182-185]

It is an important part of the ongoing care and support provided to individuals with mental health conditions.

There are several ways that treatment can be monitored [182-185]:

-Regular check-ins with a mental health professional: The patient may have regular appointments with a psychiatrist, therapist, or other mental health professional to assess their symptoms, medication effectiveness, and overall functioning.

-Tracking changes in symptoms: The patient and mental health professional may track changes in the patient's symptoms over time to assess the effectiveness of their treatment plan.

-Monitoring side effects: The patient and mental health professional may monitor for any side effects of medications or other treatments, and make any necessary adjustments to the treatment plan as needed.

-Reviewing treatment goals: The patient and mental health professional may review the patient's treatment goals and make any necessary adjustments to the treatment plan to ensure that it is meeting the patient's needs.

Treatment monitoring is used as well in detection of a potential prescribed drug misuse, while using the opportunity to raise awareness about the morbidity associated to their abnormal use.

Therapeutic adherence monitoring occupies a specific place among the monitoring opportunities. Simple approaches, such as prescription renewal counts, or the use of recent medication have demonstrated their usefulness. The goal is to ensure that the patient's treatment plan is effective and to make any necessary adjustments to optimize the patient's mental health and wellbeing.

3-The patient's medical profile update

Updating a patient's medical profile refers to the process of maintaining an accurate and current record of the patient's medical history, medications, allergies, and other relevant information.

This information is typically kept in a medical chart or electronic medical record, and is used to inform the patient's care and treatment.

There are several reasons why it is important to regularly update a patient's medical profile [182-185]:

-To ensure accurate and appropriate care: Having a current and accurate medical profile is essential for ensuring that the patient receives appropriate care. For example, if a patient has a history of allergies to certain medications, it is important for their healthcare providers to be aware of this in order to avoid prescribing those medications.

-To identify potential interactions or contraindications: Updating a patient's medical profile can help identify potential interactions or contraindications between medications or other treatments.

-To track the patient's progress: Maintaining a current medical profile can help track the patient's progress and identify any changes in their health over time.

-To facilitate communication between healthcare providers: Having a current and accurate medical profile can help facilitate communication between healthcare providers, ensuring that all members of the patient's care team have access to important information about the patient's health.

It is typically the responsibility of the patient's healthcare providers to update the patient's medical profile. However, it is also important for the patient to be proactive in providing accurate and current information about their health to their healthcare team. [182-185]

4-After care management

In order to achieve a lasting efficient recovery, the patient must take the things he learned in therapy and use them daily to pave way for a more fulfilling every-day life. The goal of aftercare is to help individuals maintain the gains they made during treatment and prevent relapse.

There are several components of aftercare management for psychiatric patients, including [182-185]:

- Self-care strategies as in aftercare management often involves teaching people self-care strategies, such as stress management techniques, to help them maintain their mental health and prevent relapse.
- Having a strong support network of friends and family can be an important part of aftercare management. It is important for psychiatric patients to have people they can turn to for support and assistance when needed.

The patient's surroundings and environment play an essential role in achieving a successful recovery, by establishing a good influence and a sense of stability on a day-to-day basis, allowing him to invest in his own well-being and recovery.

Before getting discharged, it is important to confirm next follow-up appointments while explaining to the patient the purpose that lies behind them and showing him the long term benefit that is brought along. It is necessary for psychiatric patients to continue seeing a mental health professional, such as a psychiatrist or therapist, on a regular basis following treatment. As stated before, these appointments can help identify any potential problems or concerns and ensure that the patient is continuing to make progress. Therefore, promotion and education of the continuity of care is the core of an efficient and stable long term treatment.

IV-Prevention

Mental health is based on strengths rather than deficits. It develops on the basis of autonomy as well as helping individuals and communities to recognize their strengths and establish their own destiny. [186,187]

In this sense, prevention is not measured solely by the reduction of risk factors in a given environment, but especially by the promotion of healthier factors that allow a person to take better control of his life.

It consists as well on sponsoring resilience by improving and solidifying the protective factors that interrupt negative trajectories, and adopting a more globally positive point of view. [186,187]

Prevention refers to a range of activities and strategies that aim to reduce the risk of developing mental health problems or worsening of existing mental health issues. This can include activities such as promoting healthy lifestyle habits, providing education about mental health and wellbeing, and offering support and resources to individuals who may be at risk of developing mental health problems.

Prevention efforts can target individuals, communities, or populations and may involve a variety of approaches, including public health campaigns, school-based programs, and community-based initiatives. The goal of prevention in mental health is to improve overall mental health and wellbeing, reduce the burden of mental illness on individuals and society, and prevent the negative consequences that can result from untreated mental health problems.

-Mental health education [186,187]: it involves educating people about the signs and symptoms of mental health problems, how to seek help and support if needed, and how to take care of their mental health on a day-to-day basis.

This type of education can help people to better understand and manage their own mental health, to recognize when they or someone they know may be in need of support, and to teach them coping skills and stress management techniques, while showing them the importance of self-care and self-compassion.

It can be provided through a variety of educational materials, such as brochures, posters, videos, and webinars.

In addition to providing information through educational materials, education about mental health can also involve interactive activities that allow people to learn and practice skills in a hands-on way. For example, a workshop or training session might include activities such as role-playing, group discussions, or exercises to help people learn coping skills or stress management techniques.

The content of the education may be tailored to the needs and concerns of the specific audience, and the delivery method may be adjusted to be most effective for that group.

Overall, the goal of providing education about mental health and wellbeing is to increase understanding and awareness of these issues and to promote healthy behaviors that can support mental wellbeing. By increasing knowledge and skills

related to mental health and wellbeing, individuals and communities can be better equipped to support their own mental health and the mental health of those around them.

-Promoting healthy lifestyle habits [186,187]: This can include encouraging people to eat a healthy diet, get regular physical activity, get enough sleep, and avoid unhealthy behaviors such as tobacco, alcohol and drug use or excessive use. These activities can help to improve overall physical and mental health and well-being.

-Public health campaigns [186,187]: These can be targeted at raising awareness about mental health and reducing the stigma associated with seeking help for mental health problems. Public health campaigns can take many forms, such as social media campaigns, billboards, or public service announcements, and can be aimed at reaching a wide audience.

These can involve working with local organizations and community groups to promote mental health and provide support to individuals and families in need. It includes initiatives such as setting up support groups, providing education and resources to community members, and collaborating with local organizations to promote mental health and to provide help to individuals who are experiencing stress, coping with a difficult life event, or are otherwise at risk of developing mental health problems.

-School-based programs [186,187]: These involve implementing mental health education and support programs in schools, such as counseling services, mental health awareness campaigns, or peer support groups. These promote mental health and wellbeing among students and can also provide a place for students to seek support if needed.



Conclusion



“Health is a state of complete physical, mental and social well-being and not merely an absence of disease” [102]

However, when society talks about health, mental health is often forgotten. It is considered as a balance between internal and external factors specific to each person, which can be biophysical, psychological and even social. Therefore, there is a strong connection and association linking physical and mental health together, thus one can promote or demote the other.

Trauma accidents represent one of the biggest public health problems in Morocco, one of the major causes of mortality and morbidity [1].

Not only very parsimonious mention is made of this problem in the medical literature, but the psychiatric disorders that follow these accidents are vastly significant and especially neglected. The psychological impact of trauma can be profound and long-lasting, affecting an individual's ability to function and experience a sense of well-being [136].

While potentially, an ensured psychiatric examination would be sufficient to prevent and/or treat these secondary disorders, to groom the patient in better psychological conditions to prepare him for his rehabilitation process and invest in the best future outcome regarding his physical injuries [136].

In conclusion, raising awareness about the adequate management of the psychological aspects of trauma is critical to support individuals in their journey towards healing and recovery. With the right support and resources, individuals affected by trauma can overcome the challenges they face and live fulfilling lives.



Abstracts



Abstract

Title: Trauma-Related Psychiatric Disorders

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Key words: Traumatic injury; PTSD; Anxiety; Mental health; Awareness

An accident-related trauma is an event often beyond human control that causes serious physical injuries. Whether intended or not, it results from a shock, a blow, pressure..., and can endanger the victim's life.

Accidents represent one of the biggest health hazards in Morocco, one of the main causes of mortality and morbidity. Road traffic accidents are being the first cause of trauma.

The physical outcome is handicapping and specific to each patient, while the psychological outcome is vastly unpredictable and can give birth to various secondary psychiatric disorders, hence being responsible of a severe morbidity that drastically alters the recovery process.

The purpose of this study is to describe the psychological trauma repercussions and to raise awareness about the adequate management of the psychological aspects of trauma.

Résumé

Titre : Troubles psychiatriques liés aux traumatismes

Auteur : FARAH Youssef

Rapporteur : Professeur TOUFIQ JALLAL

Mots clés : Traumatisme; TSPT; Anxiété; Santé mentale; Sensibilisation

Un accident traumatique correspond à un événement échappant souvent au contrôle humain qui provoque des lésions corporelles. Intentionnels ou non, les traumatismes résultent d'un choc, d'un coup, d'une pression..., qui peuvent mettre en danger la vie de la victime.

Ces accidents représentent l'un des plus grands problèmes sanitaires au Maroc, l'une des principales causes de mortalité et de morbidité, avec les accidents de la circulation routière assumant une responsabilité majeure.

L'évolution physique est handicapante et spécifique à chaque patient, tandis que l'évolution psychologique est très imprévisible et peut donner naissance à divers troubles psychiatriques, et donc être responsable d'une morbidité sévère qui va altérer drastiquement le processus de guérison.

Le but de cette étude est de décrire les répercussions psychologiques du traumatisme et de sensibiliser à la bonne prise en charge des aspects psychologiques du traumatisme.

ملخص

العنوان: الاضطرابات النفسية المرتبطة بالإصابة

المؤلف: فراح يوسف

المشرف: الأستاذ توفيق جلال

الكلمات الأساسية: إصابة - اضطراب ما بعد الصدمة - التوتر - الصحة النفسية - التوعية

تعتبر حادثة الصدمة حدث خارج عن سيطرة الإنسان ويتسبب في إصابات جسدية خطيرة يعاني منها الشخص، سواء كانت مقصودة أو غير مقصودة، والتي تنتج عن صدمة أو ضربة أو ضغط ... والتي يمكن أن تعرض حياة الضحية للخطر.

تمثل هذه الحوادث أحد أكبر المخاطر الصحية في المغرب، وهي أحد الأسباب الرئيسية للوفيات والمرض، وتحمل حوادث الطرق مسؤولية كبيرة.

تمثل العواقب الجسدية إعاقة وهي محددة لكل مريض، في حين أن العواقب النفسية لا يمكن التنبؤ بها إلى حد كبير ويمكن أن تولد العديد من الاضطرابات النفسية الثانوية، وبالتالي تكون مسؤولة عن امراض شديدة من شأنها أن تغير بشكل كبير عملية الشفاء.

الغرض من هذه الدراسة هو وصف تداعيات الصدمة النفسية وزيادة الوعي بالتدبير السليم للجوانب النفسية للصدمة.



Annexes



Annex A: Impact of Event Scale

INSTRUCTIONS: Below is a list of difficulties people sometimes have after stressful life events. Please read each item, and then indicate how distressing each difficulty has been for you DURING THE PAST SEVEN DAYS with respect to _____

(event)
that occurred on _____ (date). How much have you been
distressed or bothered by these difficulties?

	Not at all	A little bit	Moderately	Quite a bit	Extremely
1. Any reminder brought back feelings about it	0	1	2	3	4
2. I had trouble staying asleep	0	1	2	3	4
3. Other things kept making me think about it.	0	1	2	3	4
4. I felt irritable and angry	0	1	2	3	4
5. I avoided letting myself get upset when I thought about it or was reminded of it	0	1	2	3	4
6. I thought about it when I didn't mean to	0	1	2	3	4
7. I felt as if it hadn't happened or wasn't real.	0	1	2	3	4
8. I stayed away from reminders of it.	0	1	2	3	4
9. Pictures about it popped into my mind.	0	1	2	3	4
10. I was jumpy and easily startled.	0	1	2	3	4
11. I tried not to think about it.	0	1	2	3	4
12. I was aware that I still had a lot of feelings about it, but I didn't deal with them.	0	1	2	3	4
13. My feelings about it were kind of numb.	0	1	2	3	4
14. I found myself acting or feeling like I was back at that time.	0	1	2	3	4
15. I had trouble falling asleep.	0	1	2	3	4
16. I had waves of strong feelings about it.	0	1	2	3	4
17. I tried to remove it from my memory.	0	1	2	3	4
18. I had trouble concentrating.	0	1	2	3	4
19. Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart.	0	1	2	3	4
20. I had dreams about it.	0	1	2	3	4
21. I felt watchful and on-guard.	0	1	2	3	4
22. I tried not to talk about it.	0	1	2	3	4

Total IES-R Score: _____

INT: 1, 2, 3, 6, 9, 14, 16, 20
AVD: 5, 7, 8, 11, 12, 13, 17, 22
HYP: 4, 10, 15, 18, 19, 21

Annex B: Trauma Screening Questionnaire

Please consider the following reactions which sometimes occur after a traumatic event. This questionnaire is concerned with your personal reactions to the traumatic event which happened to you. Please indicate (Yes/No) whether or not you have experienced any of the following at least twice in the past week.

1. Upsetting thoughts or memories about the event that have come into your mind against your will	☐ No	☐ Yes
2. Upsetting dreams about the event	☐ No	☐ Yes
3. Acting or feeling as though the event were happening again	☐ No	☐ Yes
4. Feeling upset by reminders of the event	☐ No	☐ Yes
5. Bodily reactions (such as fast heartbeat, stomach churning, sweatiness, dizziness) when reminded of the event	☐ No	☐ Yes
6. Difficulty falling or staying asleep	☐ No	☐ Yes
7. Irritability or outbursts of anger	☐ No	☐ Yes
8. Difficulty concentrating	☐ No	☐ Yes
9. Heightened awareness of potential dangers to yourself and others	☐ No	☐ Yes
10. Being jumpy or being startled at something unexpected	☐ No	☐ Yes

Annex C: Hospital Anxiety and Depression Scale

Tick the box beside the reply that is closest to how you have been feeling in the past week.
Don't take too long over you replies: your immediate is best.

D	A		D	A	
		I feel tense or 'wound up':			I feel as if I am slowed down:
	3	Most of the time		3	Nearly all the time
	2	A lot of the time		2	Very often
	1	From time to time, occasionally		1	Sometimes
	0	Not at all		0	Not at all
		I still enjoy the things I used to enjoy:			I get a sort of frightened feeling like 'butterflies' in the stomach:
	0	Definitely as much		0	Not at all
	1	Not quite so much		1	Occasionally
	2	Only a little		2	Quite Often
	3	Hardly at all		3	Very Often
		I get a sort of frightened feeling as if something awful is about to happen:			I have lost interest in my appearance:
	3	Very definitely and quite badly		3	Definitely
	2	Yes, but not too badly		2	I don't take as much care as I should
	1	A little, but it doesn't worry me		1	I may not take quite as much care
	0	Not at all		0	I take just as much care as ever
		I can laugh and see the funny side of things:			I feel restless as I have to be on the move:
	0	As much as I always could		3	Very much indeed
	1	Not quite so much now		2	Quite a lot
	2	Definitely not so much now		1	Not very much
	3	Not at all		0	Not at all
		Worrying thoughts go through my mind:			I look forward with enjoyment to things:
	3	A great deal of the time		0	As much as I ever did
	2	A lot of the time		1	Rather less than I used to
	1	From time to time, but not too often		2	Definitely less than I used to
	0	Only occasionally		3	Hardly at all
		I feel cheerful:			I get sudden feelings of panic:
	3	Not at all		3	Very often indeed
	2	Not often		2	Quite often
	1	Sometimes		1	Not very often
	0	Most of the time		0	Not at all
		I can sit at ease and feel relaxed:			I can enjoy a good book or radio or TV program:
	0	Definitely		0	Often
	1	Usually		1	Sometimes
	2	Not Often		2	Not often
	3	Not at all		3	Very seldom

Please check you have answered all the questions

Scoring:

Total score: Depression (D) _____ Anxiety (A) _____

0-7 = Normal

8-10 = Borderline abnormal (borderline case)

11-21 = Abnormal (case)

Annex D: Stanford Acute Stress Reaction Questionnaires

Stanford Acute Stress Reaction Questionnaire

DIRECTIONS:

Recall the stressful events that occurred in your life during the PAST MONTH.

Briefly describe the one event that was the most disturbing on the lines below:

How disturbing was this event to you? (Please mark one):

- Not at all disturbing ☐
- Somewhat disturbing ☐
- Moderately disturbing ☐
- Very disturbing ☐
- Extremely disturbing ☐

DIRECTIONS: Below is a list of experiences people sometimes have during and after a stressful event. Please read each item carefully and decide how well it describes *your* experience since the stressful event described above. Refer to this event in answering the items that mention "the stressful event." Use the 0-5 point scale shown below and circle the number that best describes your experience.

0-----1-----2-----3-----4-----5
 not very rarely rarely sometimes often very often
 experienced experienced experienced experienced experienced experienced

1.	I had difficulty falling or staying asleep.	0	1	2	3	4	5
2.	I felt restless.	0	1	2	3	4	5
3.	I felt a sense of timelessness.	0	1	2	3	4	5
4.	I was slow to respond.	0	1	2	3	4	5
5.	I tried to avoid feelings about the stressful event.	0	1	2	3	4	5
6.	I had repeated distressing dreams of the stressful event.	0	1	2	3	4	5
7.	I felt extremely upset if exposed to events that reminded me of an aspect of the stressful event.	0	1	2	3	4	5
8.	I would jump in surprise at the least thing.	0	1	2	3	4	5
9.	The stressful event made it difficult for me to perform work or other things I needed to do.	0	1	2	3	4	5
10.	I did not have the usual sense of who I am.	0	1	2	3	4	5

11.	I tried to avoid activities that reminded me of the stressful event.	0	1	2	3	4	5
12.	I felt hypervigilant or "on edge".	0	1	2	3	4	5
13.	I experienced myself as though I were a stranger.	0	1	2	3	4	5
14.	I tried to avoid conversations about the stressful event.	0	1	2	3	4	5
15.	I had a bodily reaction when exposed to reminders of the stressful event.	0	1	2	3	4	5
16.	I had problems remembering important details about the stressful event.	0	1	2	3	4	5
17.	I tried to avoid thoughts about the stressful event.	0	1	2	3	4	5
18.	Things I saw looked different to me from how I know they really looked.	0	1	2	3	4	5
19.	I had repeated and unwanted memories of the stressful event.	0	1	2	3	4	5
20.	I felt distant from my own emotions.	0	1	2	3	4	5
21.	I felt irritable or had outbursts of anger.	0	1	2	3	4	5
22.	I avoided contact with people who reminded me of the stressful event.	0	1	2	3	4	5
23.	I would suddenly act or feel as if the stressful event was happening again.	0	1	2	3	4	5
24.	My mind went blank.	0	1	2	3	4	5
25.	I had amnesia for large periods of the stressful event.	0	1	2	3	4	5
26.	The stressful event caused problems in my relationships with other people.	0	1	2	3	4	5
27.	I had difficulty concentrating.	0	1	2	3	4	5
28.	I felt estranged or detached from other people.	0	1	2	3	4	5
29.	I had a vivid sense that the stressful event was happening all over again.	0	1	2	3	4	5
30.	I tried to stay away from places that reminded me of the stressful event.	0	1	2	3	4	5

On how many days did you experience any of the above symptoms of distress? (Please mark one):

No days	☐
One day	☐
Two days	☐
Three days	☐
Four days	☐
Five or more days	☐

Annex E: Beck Depression Inventory

This depression inventory can be self-scored. The scoring scale is at the end of the questionnaire.

1.
 - 0 I do not feel sad.
 - 1 I feel sad
 - 2 I am sad all the time and I can't snap out of it.
 - 3 I am so sad and unhappy that I can't stand it.
2.
 - 0 I am not particularly discouraged about the future.
 - 1 I feel discouraged about the future.
 - 2 I feel I have nothing to look forward to.
 - 3 I feel the future is hopeless and that things cannot improve.
3.
 - 0 I do not feel like a failure.
 - 1 I feel I have failed more than the average person.
 - 2 As I look back on my life, all I can see is a lot of failures.
 - 3 I feel I am a complete failure as a person.
4.
 - 0 I get as much satisfaction out of things as I used to.
 - 1 I don't enjoy things the way I used to.
 - 2 I don't get real satisfaction out of anything anymore.
 - 3 I am dissatisfied or bored with everything.
5.
 - 0 I don't feel particularly guilty
 - 1 I feel guilty a good part of the time.
 - 2 I feel quite guilty most of the time.
 - 3 I feel guilty all of the time.
6.
 - 0 I don't feel I am being punished.
 - 1 I feel I may be punished.
 - 2 I expect to be punished.
 - 3 I feel I am being punished.
7.
 - 0 I don't feel disappointed in myself.
 - 1 I am disappointed in myself.
 - 2 I am disgusted with myself.
 - 3 I hate myself.
8.
 - 0 I don't feel I am any worse than anybody else.
 - 1 I am critical of myself for my weaknesses or mistakes.
 - 2 I blame myself all the time for my faults.
 - 3 I blame myself for everything bad that happens.
9.
 - 0 I don't have any thoughts of killing myself.
 - 1 I have thoughts of killing myself, but I would not carry them out.
 - 2 I would like to kill myself.
 - 3 I would kill myself if I had the chance.
10.
 - 0 I don't cry any more than usual.
 - 1 I cry more now than I used to.
 - 2 I cry all the time now.
 - 3 I used to be able to cry, but now I can't cry even though I want to.

11.
 0 I am no more irritated by things than I ever was.
 1 I am slightly more irritated now than usual.
 2 I am quite annoyed or irritated a good deal of the time.
 3 I feel irritated all the time.
12.
 0 I have not lost interest in other people.
 1 I am less interested in other people than I used to be.
 2 I have lost most of my interest in other people.
 3 I have lost all of my interest in other people.
13.
 0 I make decisions about as well as I ever could.
 1 I put off making decisions more than I used to.
 2 I have greater difficulty in making decisions more than I used to.
 3 I can't make decisions at all anymore.
14.
 0 I don't feel that I look any worse than I used to.
 1 I am worried that I am looking old or unattractive.
 2 I feel there are permanent changes in my appearance that make me look unattractive.
 3 I believe that I look ugly.
15.
 0 I can work about as well as before.
 1 It takes an extra effort to get started at doing something.
 2 I have to push myself very hard to do anything.
 3 I can't do any work at all.
16.
 0 I can sleep as well as usual.
 1 I don't sleep as well as I used to.
 2 I wake up 1-2 hours earlier than usual and find it hard to get back to sleep.
 3 I wake up several hours earlier than I used to and cannot get back to sleep.
17.
 0 I don't get more tired than usual.
 1 I get tired more easily than I used to.
 2 I get tired from doing almost anything.
 3 I am too tired to do anything.
18.
 0 My appetite is no worse than usual.
 1 My appetite is not as good as it used to be.
 2 My appetite is much worse now.
 3 I have no appetite at all anymore.
19.
 0 I haven't lost much weight, if any, lately.
 1 I have lost more than five pounds.
 2 I have lost more than ten pounds.
 3 I have lost more than fifteen pounds.

- 20.
- 0 I am no more worried about my health than usual.
 - 1 I am worried about physical problems like aches, pains, upset stomach, or constipation.
 - 2 I am very worried about physical problems and it's hard to think of much else.
 - 3 I am so worried about my physical problems that I cannot think of anything else.
- 21.
- 0 I have not noticed any recent change in my interest in sex.
 - 1 I am less interested in sex than I used to be.
 - 2 I have almost no interest in sex.
 - 3 I have lost interest in sex completely.

INTERPRETING THE BECK DEPRESSION INVENTORY

Now that you have completed the questionnaire, add up the score for each of the twenty-one questions by counting the number to the right of each question you marked. The highest possible total for the whole test would be sixty-three. This would mean you circled number three on all twenty-one questions. Since the lowest possible score for each question is zero, the lowest possible score for the test would be zero. This would mean you circles zero on each question. You can evaluate your depression according to the Table below.

Total Score	Levels of Depression
1-10	These ups and downs are considered normal
11-16	Mild mood disturbance
17-20	Borderline clinical depression
21-30	Moderate depression
31-40	Severe depression
over 40	Extreme depression

Annex F: Beck Anxiety Inventory

Below is a list of common symptoms of anxiety. Please carefully read each item in the list. Indicate how much you have been bothered by that symptom during the past month, including today, by circling the number in the corresponding space in the column next to each symptom.

	Not At All	Mildly but it didn't bother me much.	Moderately - it wasn't pleasant at times	Severely – it bothered me a lot
Numbness or tingling	0	1	2	3
Feeling hot	0	1	2	3
Wobbliness in legs	0	1	2	3
Unable to relax	0	1	2	3
Fear of worst happening	0	1	2	3
Dizzy or lightheaded	0	1	2	3
Heart pounding/racing	0	1	2	3
Unsteady	0	1	2	3
Terrified or afraid	0	1	2	3
Nervous	0	1	2	3
Feeling of choking	0	1	2	3
Hands trembling	0	1	2	3
Shaky / unsteady	0	1	2	3
Fear of losing control	0	1	2	3
Difficulty in breathing	0	1	2	3
Fear of dying	0	1	2	3
Scared	0	1	2	3
Indigestion	0	1	2	3
Faint / lightheaded	0	1	2	3
Face flushed	0	1	2	3
Hot/cold sweats	0	1	2	3
Column Sum				

Scoring - Sum each column. Then sum the column totals to achieve a grand score. Write that score here _____.

Interpretation

A grand sum between **0 – 21** indicates very low anxiety. That is usually a good thing. However, it is possible that you might be unrealistic in either your assessment which would be denial or that you have learned to “mask” the symptoms commonly associated with anxiety. Too little “anxiety” could indicate that you are detached from yourself, others, or your environment.

A grand sum between **22 – 35** indicates moderate anxiety. Your body is trying to tell you something. Look for patterns as to when and why you experience the symptoms described above. For example, if it occurs prior to public speaking and your job requires a lot of presentations you may want to find ways to calm yourself before speaking or let others do some of the presentations. You may have some conflict issues that need to be resolved. Clearly, it is not “panic” time but you want to find ways to manage the stress you feel.

A grand sum that **exceeds 36** is a potential cause for concern. Again, look for patterns or times when you tend to feel the symptoms you have circled. Persistent and high anxiety is not a sign of personal weakness or failure. It is, however, something that needs to be proactively treated or there could be significant impacts to you mentally and physically. You may want to consult a counselor if the feelings persist.



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Hippocratic Oath

At the time of being admitted as a member of the medical profession, I solemnly swear that:

- *I will devote my life to serving humanity.*
- *I will treat my teachers with due respect and appreciation.*
- *I will practice my profession with conscience and dignity, with my patient's health as my first consideration.*
- *I will not betray the secrets that are confided in me.*
- *I will maintain by all the means in my power, the honour and the noble traditions of the medical profession.*
- *My colleagues will be my brothers.*
- *I will not permit considerations of religion, nationality, race, political or social standing to intervene between my duty and my patient.*
- *I will maintain the utmost respect for human life from the time of conception.*
- *Even under threat, I will not use my medical knowledge in a manner contrary to the laws of humanity.*
- *I pledge this freely and on my honour.*





Serment d'Hippocrate

Au moment d'être admis à devenir membre de la profession médicale, je m'engage solennellement à consacrer ma vie au service de l'humanité.

- *Je traiterai mes maîtres avec le respect et la reconnaissance qui leur sont dus.*
- *Je pratiquerai ma profession avec conscience et dignité. La santé de mes malades sera mon premier but.*
- *Je ne trahirai pas les secrets qui me seront confiés.*
- *Je maintiendrai par tous les moyens en mon pouvoir l'honneur et les nobles traditions de la profession médicale.*
- *Les médecins seront mes frères.*
- *Aucune considération de religion, de nationalité, de race, aucune considération politique et sociale ne s'interposera entre mon devoir et mon patient.*
- *Je maintiendrai le respect de la vie humaine dès la conception.*
- *Même sous la menace, je n'userai pas de mes connaissances médicales d'une façon contraire aux lois de l'humanité.*
- *Je m'y engage librement et sur mon honneur.*





قسم أبقراط

بسم الله الرحمن الرحيم

أقسم بالله العظيم

في هذه اللحظة التي يتم فيها قبولي عضوا في المهنة الطبية أتعهد علانية:

- بأن أكرس حياتي لخدمة الإنسانية.
- وأن أحترم أسانذتي وأعترف لهم بالجميل الذي يستحقونه.
- وأن أمارس مهنتي بوانزع من ضميري وشر في جاعلا صحة مريض هدي في الأول.
- وأن لا أفشي الأسرار المعهودة إلي.
- وأن أحافظ بكل ما لدي من وسائل على الشرف والتقاليد النبيلة لمهنة الطب.
- وأن أعتبر سائر الأطباء إخوة لي.
- وأن أقوم بواجبي نحو مرضاي بدون أي اعتبار ديني أو وطني أو عرقي أو سياسي أو اجتماعي.
- وأن أحافظ بكل حزم على احترام الحياة الإنسانية منذ نشأتها.
- وأن لا أستعمل معلوماتي الطبية بطريق يضر بحقوق الإنسان مهما لاقيت من تهديد.
- بكل هذا أتعهد عن كامل اختياري ومقسما بالله.

والله على ما أقول شهيد.





المملكة المغربية
جامعة محمد الخامس بالرباط
كلية الطب والصيدلة
الرباط



أطروحة رقم: 45

سنة : 2023

الاضطرابات النفسية المرتبطة بالإصابة

أطروحة

قدمت ونوقشت علانية يوم : / / 2023

من طرف

السيد يوسف فراح

المزاد في 10 دجنبر 1996 بالرباط

لنيل شهادة

دكتور في الطب

الكلمات الأساسية : إصابة؛ اضطراب ما بعد الصدمة؛ التوتر؛ الصحة النفسية؛ التوعية

أعضاء لجنة التحكيم:

رئيسة

السيدة ماري صابر

مشرف

أستاذة في الطب النفسي

السيد جلال توفيق

عضو

أستاذ في الطب النفسي

السيد عبد الصمد الوهابي

عضو

أستاذ في جراحة الدماغ والأعصاب

السيد فؤاد العبودي

أستاذ في الطب النفسي