2 Congresso Nazionale

GESTIONE DEL TRAUMA DI INTERESSE CHIRURGICO

Gestione integrata del trauma maggiore dalla scena dell'evento alla cura definitiva

Lectio magistralis

La gestione del trauma grave: tra innovazione e formazione

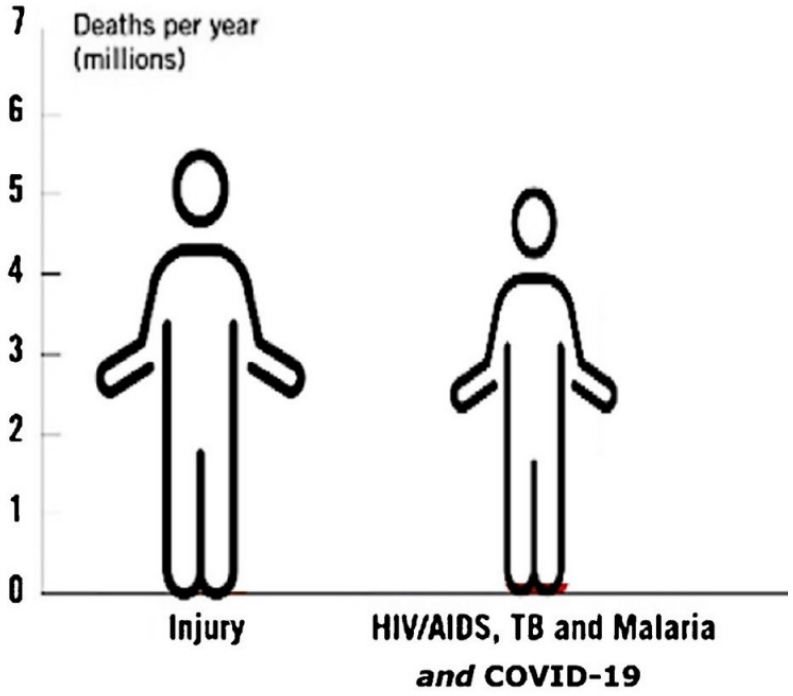
Pierluigi Marini

Direttore U.O.C. Chirurgia Generale, d'Urgenza e delle Nuove Tecnologie
Direttore Dipartimento di Urgenza e Accettazione e Chirurgie Specialistiche
Azienda Ospedaliera San Camillo Forlanini - Roma

Il trauma grave (ISS>15)

- Principale causa di morte sotto i 45 anni
- 5.2 milioni di morti per trauma nel mondo (2020)
- Per ogni decesso, 2-3 invalidi permanenti
- Principale causa di perdita di vita lavorativa
- Elevato costo sociale:
  - superiore al costo per le malattie cardiovascolari e neoplastiche
  - € 7.500.000 spesi ogni anno in Italia solo per gli incidenti stradali

Il trauma grave: numeri e costi



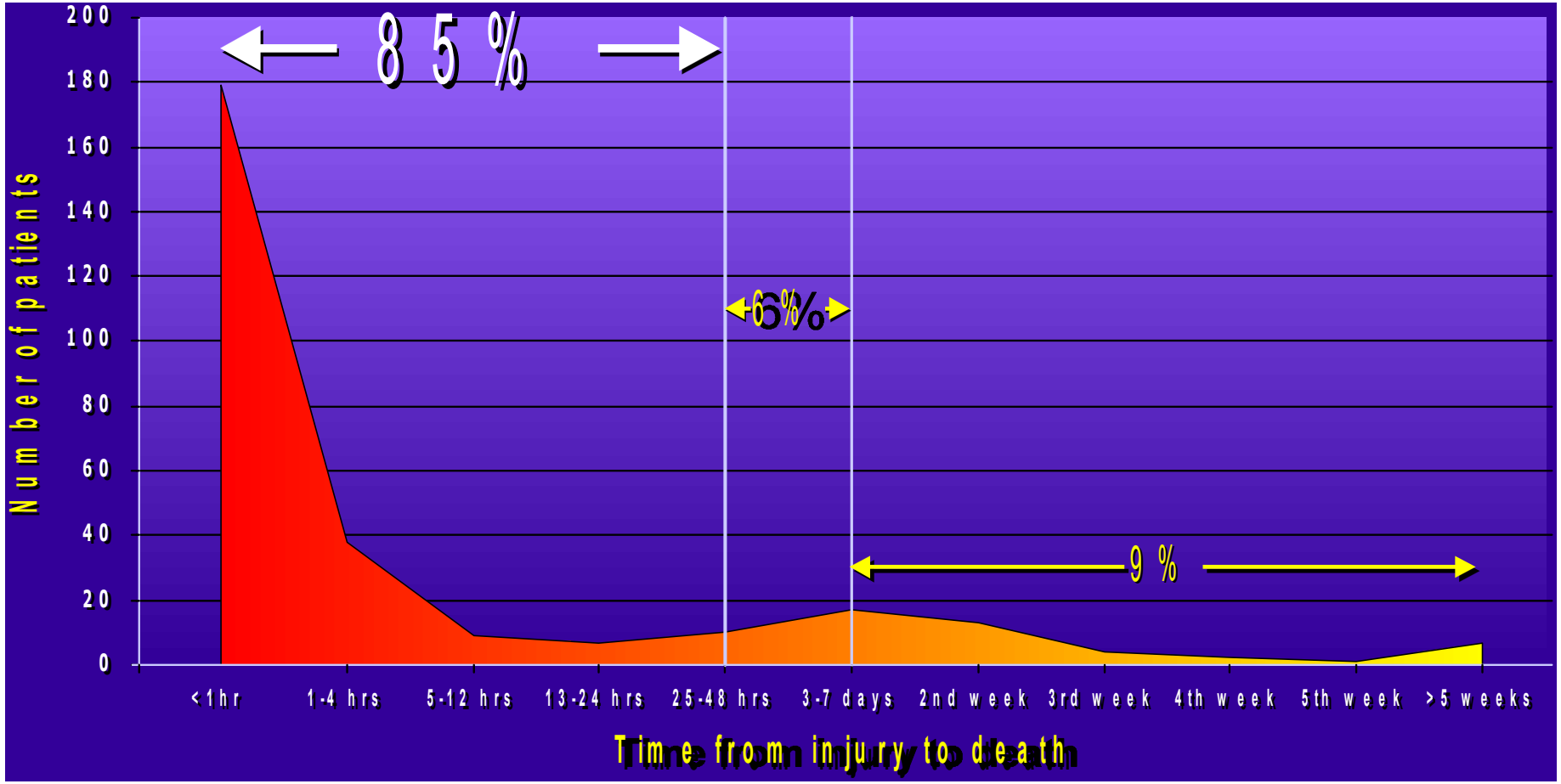
5-6 million Trauma related deaths every year

1. Road traffic, 23%
2. ("Others", 21%)
3. Suicide, 15%
4. "Homicide", 11%
5. "Falls", 8%
6. Drowning, 7%
7. Poisoning, 6%
8. Burns, 6%
9. War, 3%

Riabilitazione

Rossiter ND. "Trauma-the forgotten pandemic?". Int Orthop. 2022 Jan;46(1):3-11.Epub 2021 Sep 14

Il trauma grave: epidemiologia



Il trauma grave: epidemiologia

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

Cambiamenti numeri in periodo COVID 19

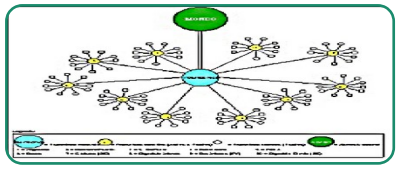
- Durante il lockdown aumento di tentati suicidi
- Traumi stradali diminuiti ma piu gravi

Dati recenti (Spagna) mostrano aumento numeri di aggressione da arma bianca post-covid

Grande problema di numeri con impatto sulla formazione (negli HUB come negli SPOKE)

Gestione del trauma grave – dalla DCS alla formazione continua

Un po' di storia



Organizzazione

Innovazione e tecnologia

Strategie chirurgiche Damage Control

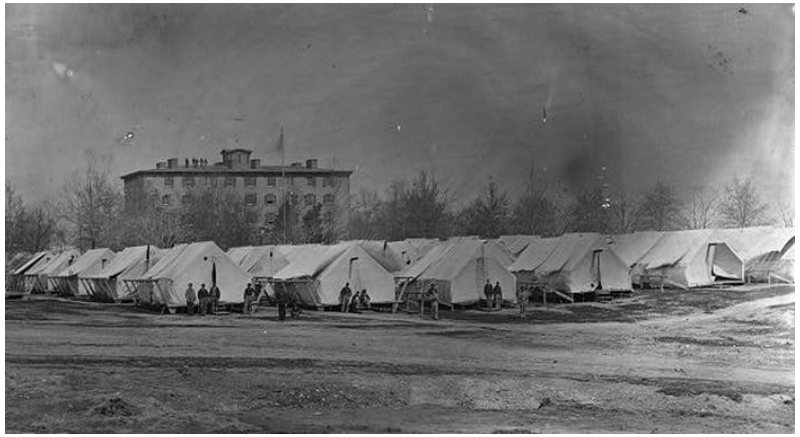
Formazione

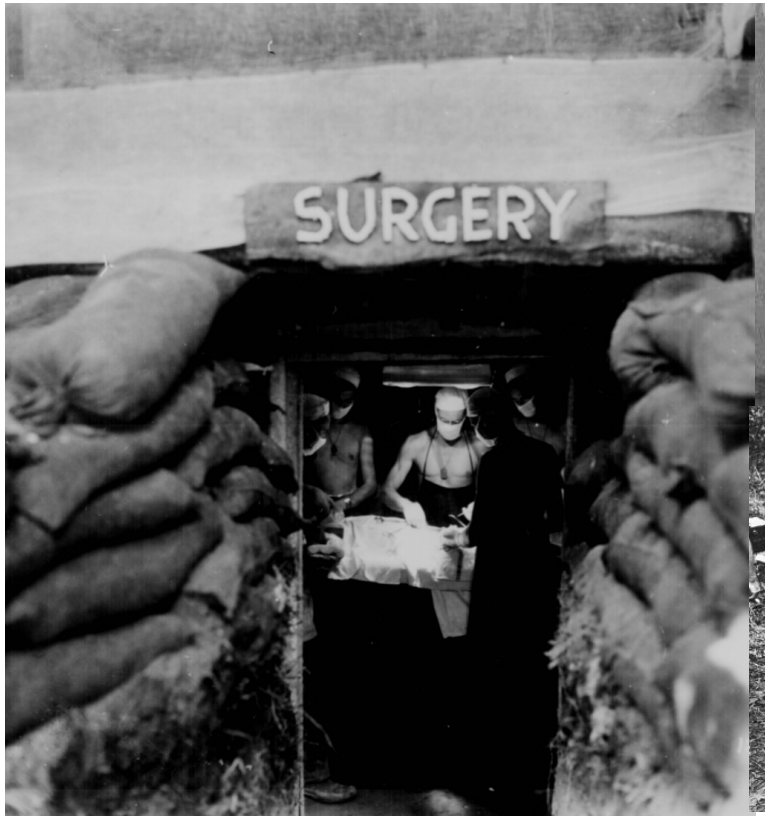
Il trauma grave: un po' di storia

Le guerre del XIX sec.

1812 Campagna Di Russia: Flying Ambulance di Larrey

1861-65 Guerra Civile Americana: Medical Evacuation System





Le due guerre mondiali:

Il triage e le “Portable Surgical Hospital”

Guerra di Corea e Vietnam

MASH Mobile Army Surgical Hospital

Adam Cowley

- 1970 Trauma Center A. Cowley Baltimore
- 1975 Emergency Medical Service System

GOLDEN HOUR

MIGLIORE CURA POSSIBILE

Dall'Ospedale più vicino all'ospedale più adatto

Il Sistema Italia

1980 Attentato Stazione di Bologna

1992 DPR 27 marzo

"Atto di indirizzo e coordinamento alle Regioni per la determinazione dei livelli di assistenza sanitaria di emergenza"

Centrale Operativa 118

Attività Pronto Soccorso e Dipartimenti di Emergenza

1996 G.U.114 17 maggio

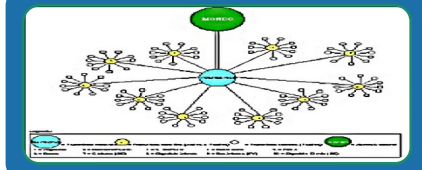
Conferenza Stato-Regioni le "Linee – Guida sul sistema dell'emergenza sanitaria"

Sistema Territoriale 4 livelli:

Primo Intervento
Pronto Soccorso
DEA I Livello
DEA II Livello

il paziente trova tutte le risorse necessarie al trattamento nell'Ospedale di riferimento . Queste risorse, però, possono provenire da tutte le strutture dell'area.

Un po' di storia



Organizzazione

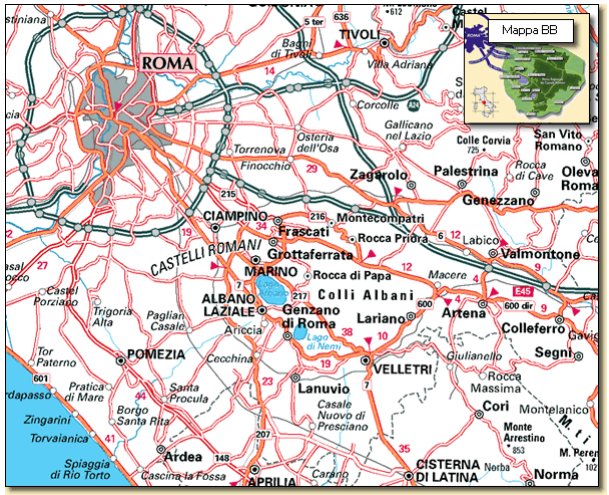
Innovazione e tecnologia

Strategie chirurgiche – Damage Control

Formazione

Gestione regionale – Problemi organizzativi

- Distanza tra luogo del soccorso e HUB
- Pronto soccorso senza gli skill per stabilizzare
- Trasferimenti e centralizzazione
- Struttura interna all'ospedale – Disposizione sala operatorial, PS, radiologia



Gestione regionale – Problemi organizzativi

The Effect of Organized Systems of Trauma Care on Motor Vehicle Crash Mortality

Avery B. Nathens, MD, PhD
Gregory J. Jurkovich, MD
Peter Cummings, MD, MPH
Frederick P. Rivara, MD, MPH
Ronald V. Maier, MD

Context Despite calls for wider national implementation of an integrated approach to trauma care, the effectiveness of this approach at a regional or state level remains unproven.

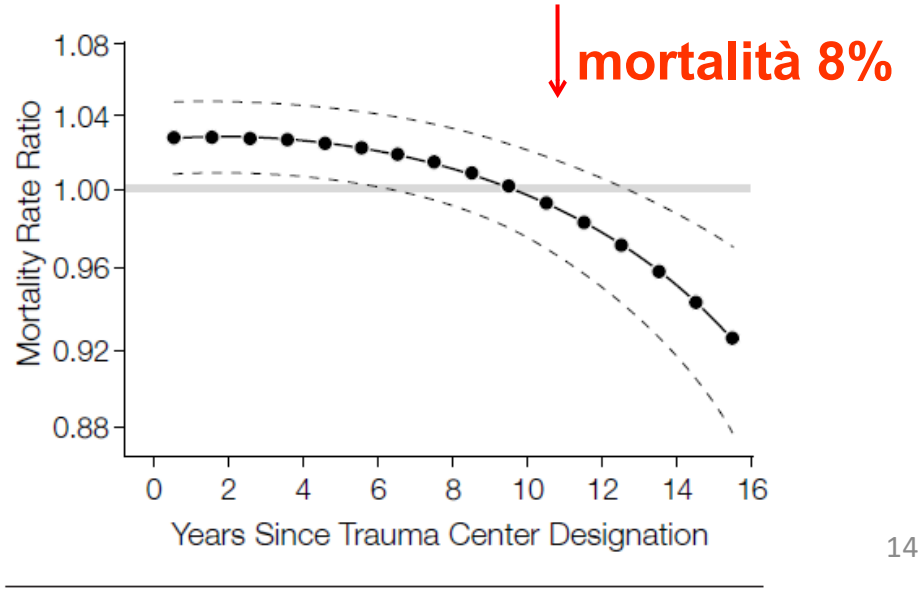
Objective To determine whether implementation of an organized system of trauma care reduces mortality due to motor vehicle crashes.

Design Cross-sectional time-series analysis of crash mortality data collected for 1979 through 1995 from the Fatality Analysis Reporting System.

Table 1. Crash Mortality Rates in States With Organized Systems of Trauma Care: 1979-1995

State	Organizing Authority	Year of First Trauma Center Designation	Crash Mortality per 100 000 Person-years		Mortality Rate Ratio (95% CI)*
			Presystem	Postsystem	
California	Regional	1980	16.8	12.2	0.73 (0.70-0.75)
Connecticut	State	1995	10.0	7.9	0.79 (0.68-0.92)
District of Columbia	State/district	1987	4.0	5.2	1.28 (1.05-1.57)
Florida	Regional	1987	16.8	14.4	0.86 (0.84-0.88)
Georgia	Regional development, state enforcement	1982	22.7	19.4	0.86 (0.82-0.89)
Illinois	Regional development, state enforcement	1988	11.4	10.9	0.96 (0.93-0.99)

Figure. Crash Mortality as a Function of Time From First Trauma Center Designation



Gestione regionale – Regione Lazio

Supplemento ordinario n. 206 al "Bollettino Ufficiale" n. 45 del 7 dicembre 2010

Poste Italiane S.p.A. - Spediz. in abb. postale 70% - DCR Roma

REPUBBLICA ITALIANA

BOLLETTINO UFFICIALE
DELLA REGIONE LAZIO

Roma, 7 dicembre 2010 *PARTE PRIMA - PARTE SECONDA* Si pubblica normalmente il 7, 14, 21 e 28 di ogni mese
Registrazione: Tribunale di Roma n. 569/1986

DIREZIONE REDAZIONE E AMMINISTRAZIONE PRESSO LA PRESIDENZA DELLA GIUNTA REGIONALE - VIA CRISTOFORO COLOMBO, 212 - 00147 ROMA

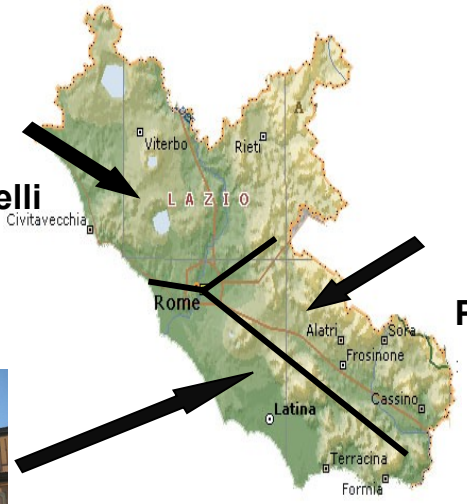
IL BOLLETTINO UFFICIALE si pubblica a Roma in due distinti fascicoli:
1) la Parte I (Atti della Regione) e la Parte II (Atti dello Stato e della U.E.)
2) la Parte III (Avvisi e concorsi)

- Rete del Trauma
- Rete dell'Ictus Cerebrale Acuto
- Rete dell'ischemia cardiaca
- Rete cardiochirurgia
- Rete chir vascolare maggiore
- Rete della Chir. Maxillo-Facciale
- Rete della Chirurgia Plastica
- Rete della Chirurgia della Mano
- Rete Cure Palliative

Gestione regionale – Regione Lazio

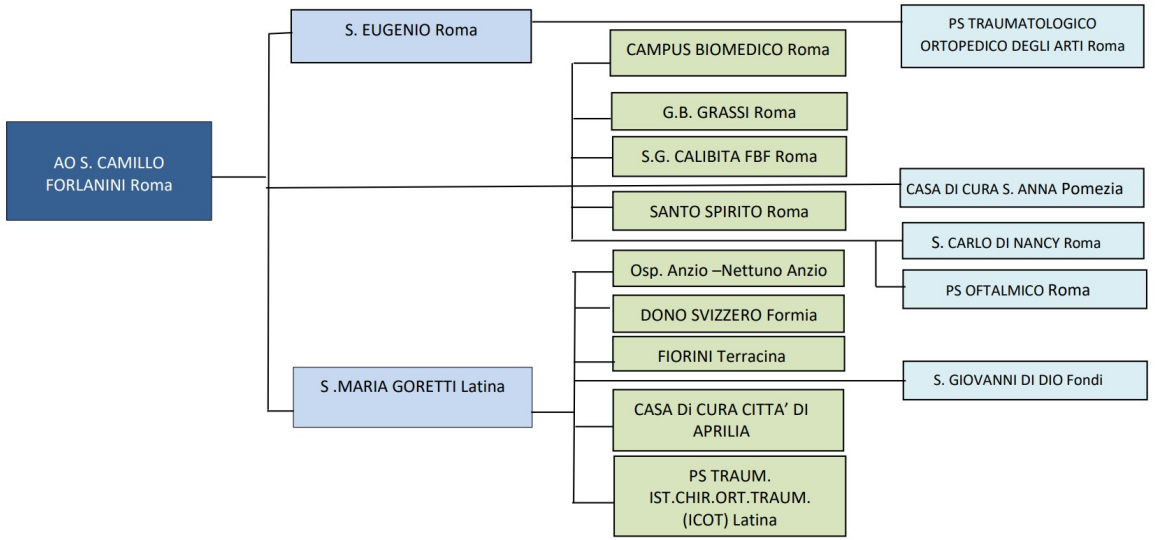
RETE TRAUMA GRAVE- Piano di Rete (Estratto Bollettino Ufficiale della Regione Lazio, DET G15438 del 15.12.2020)

Policlinico Gemelli



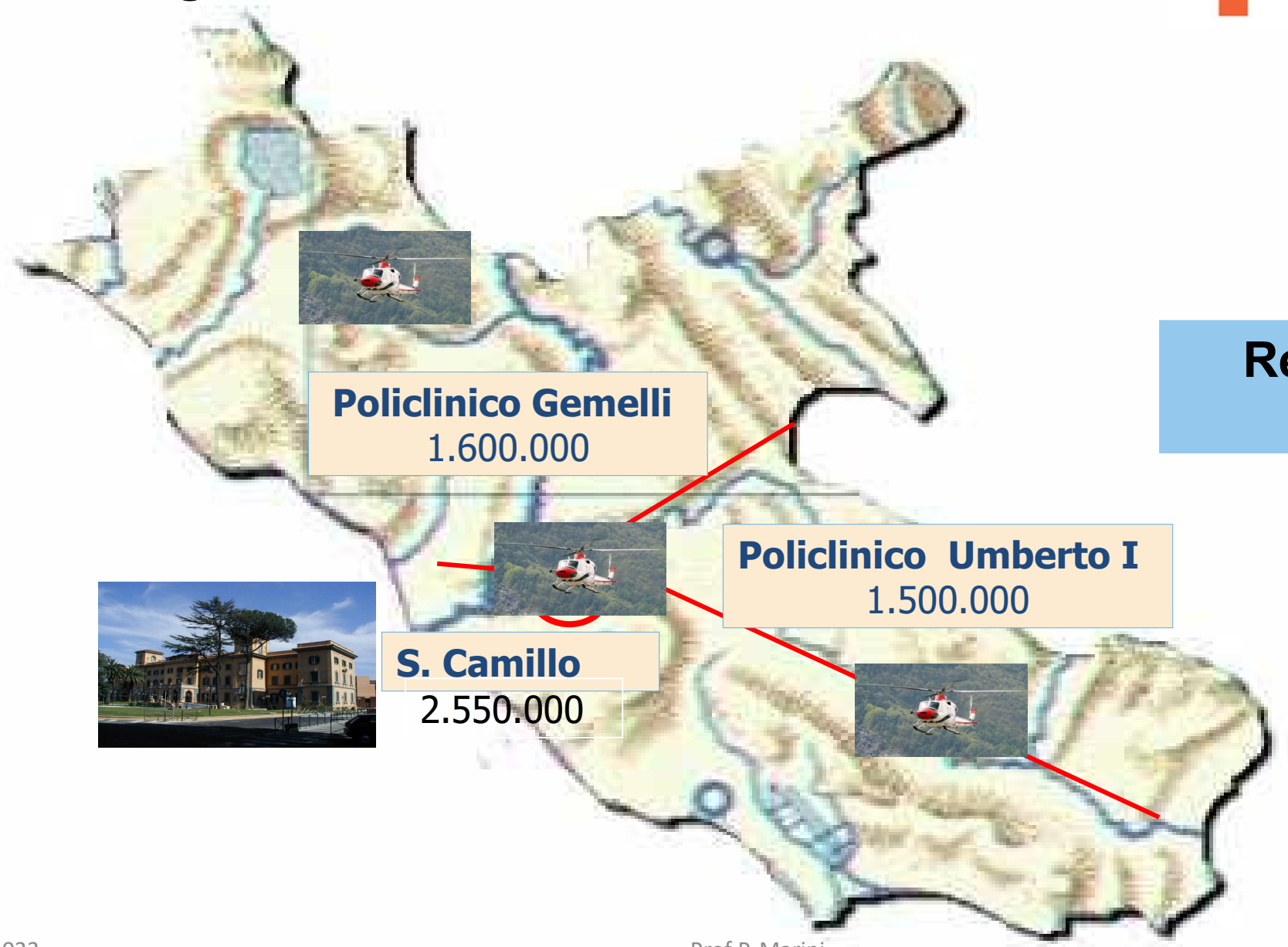
Policlinico Umberto I

AO San Camillo



Gestione regionale – A.O. San Camillo Forlanini

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI



Rete Trauma del Lazio

Gestione regionale – A.O. San Camillo Forlanini

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

Home › Sanità Lazio › Sanità, San Camillo: "Primi in Italia nella rete trauma con punteggio Isco...

Sanità Lazio

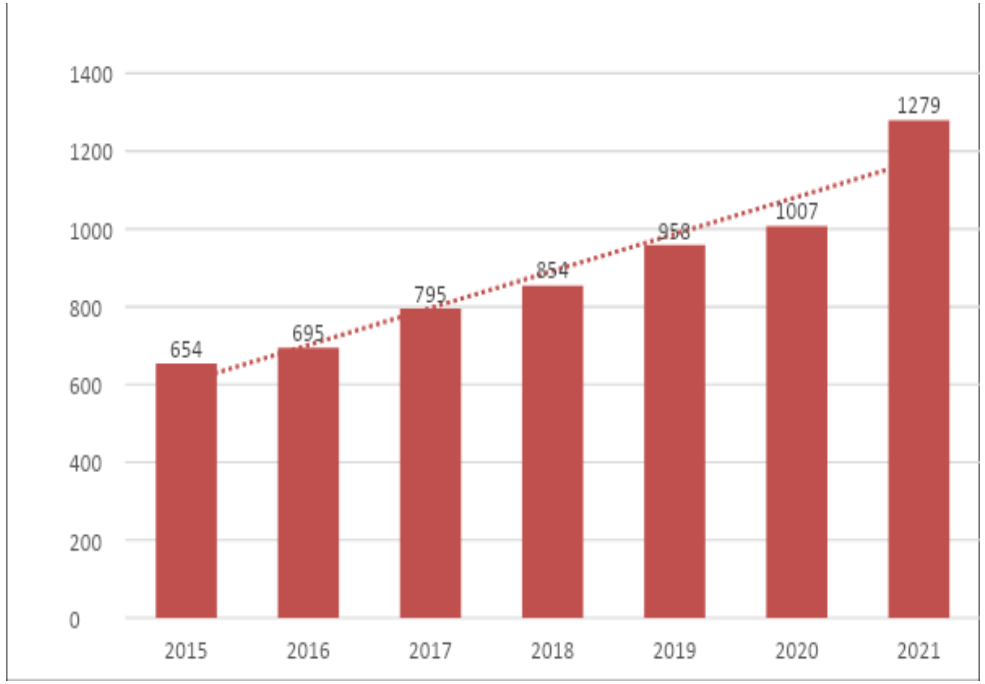
Sanità, San Camillo: "Primi in Italia nella rete trauma con punteggio Isco di Agenas più elevato"

By **Di Online News** - 10 Maggio 2022 0

Lazio 1^ posto in Italia per indicatori nazionali di efficienza punteggio ISCO più elevato (Dati AGENAS)

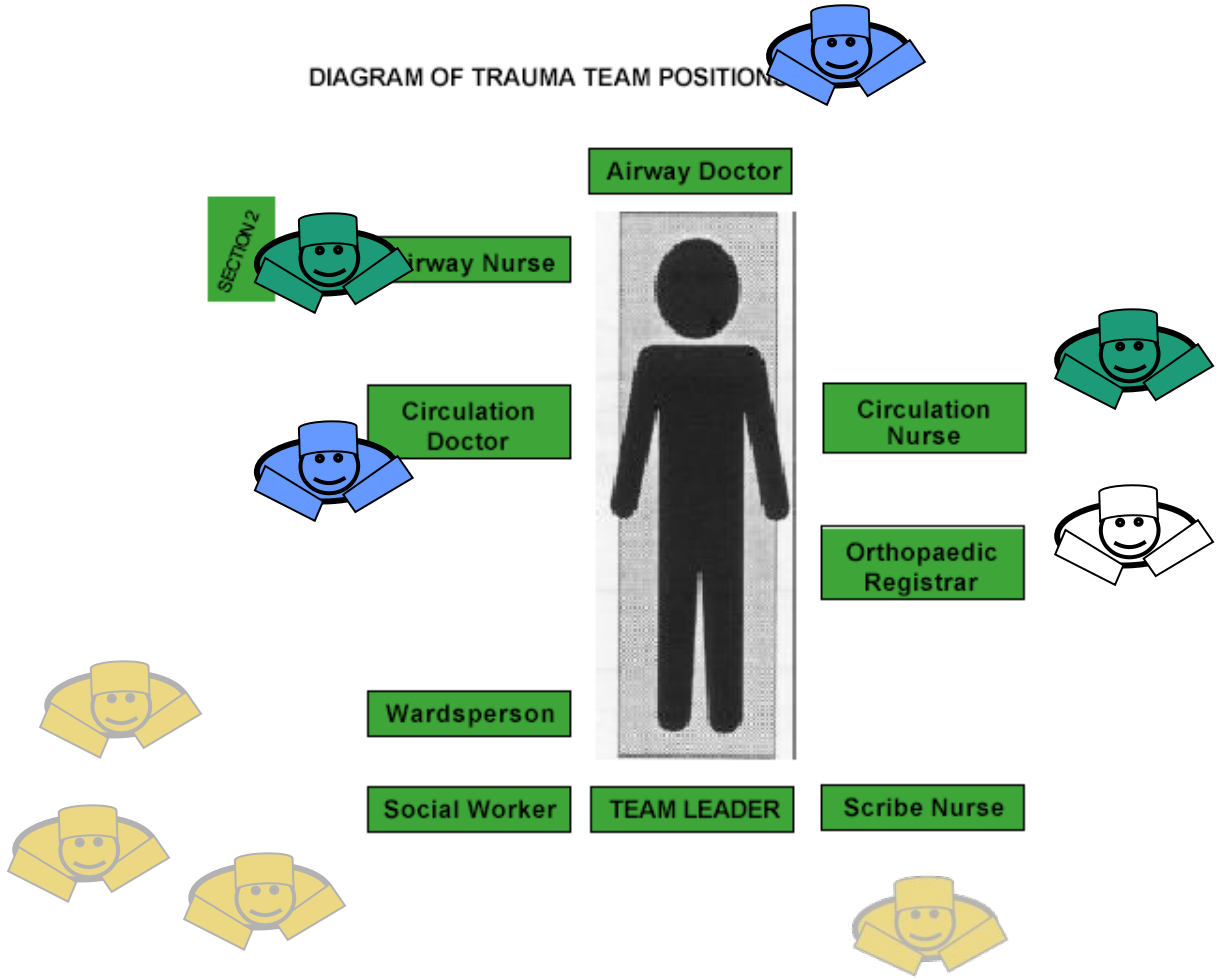
Nel 2021 1280 accessi per trauma al San Camillo

Accessi al DEA dell'A.O. San Camillo – Trauma grave



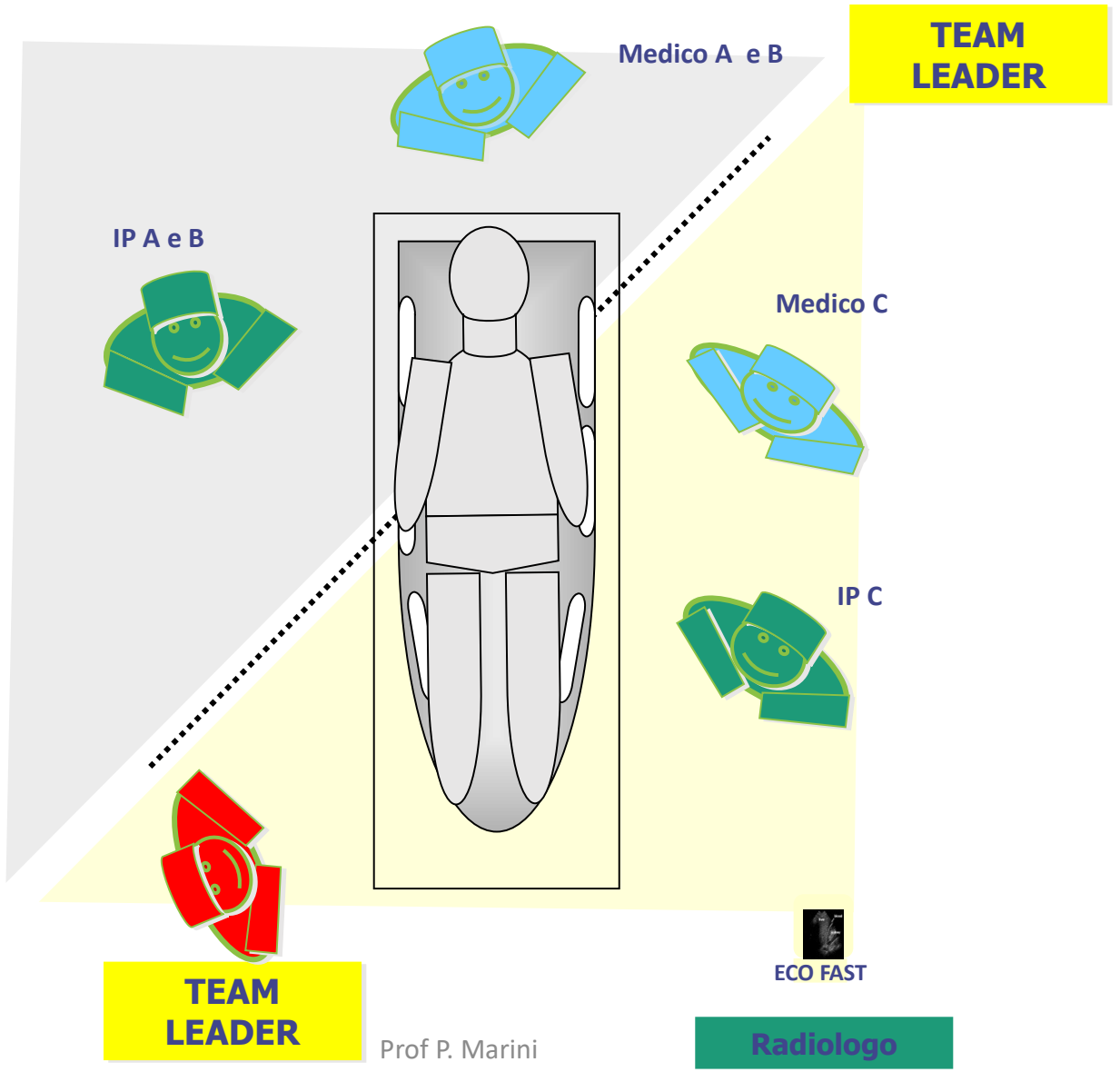
Gestione regionale – A.O. San Camillo Forlanini

Liverpool hospital Emergency room – trauma team «ideale»



Gestione regionale – A.O. San Camillo Forlanini

Il nostro team

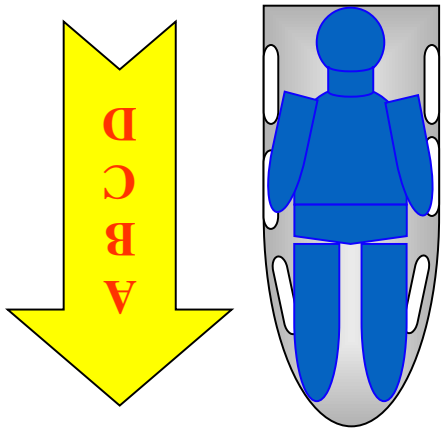


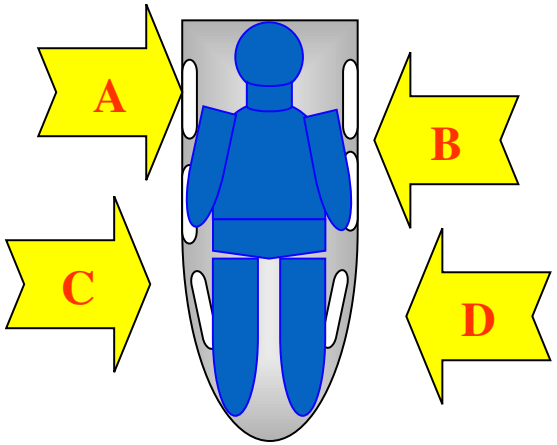
Gestione regionale – A.O. San Camillo Forlanini

“Coreografia”:

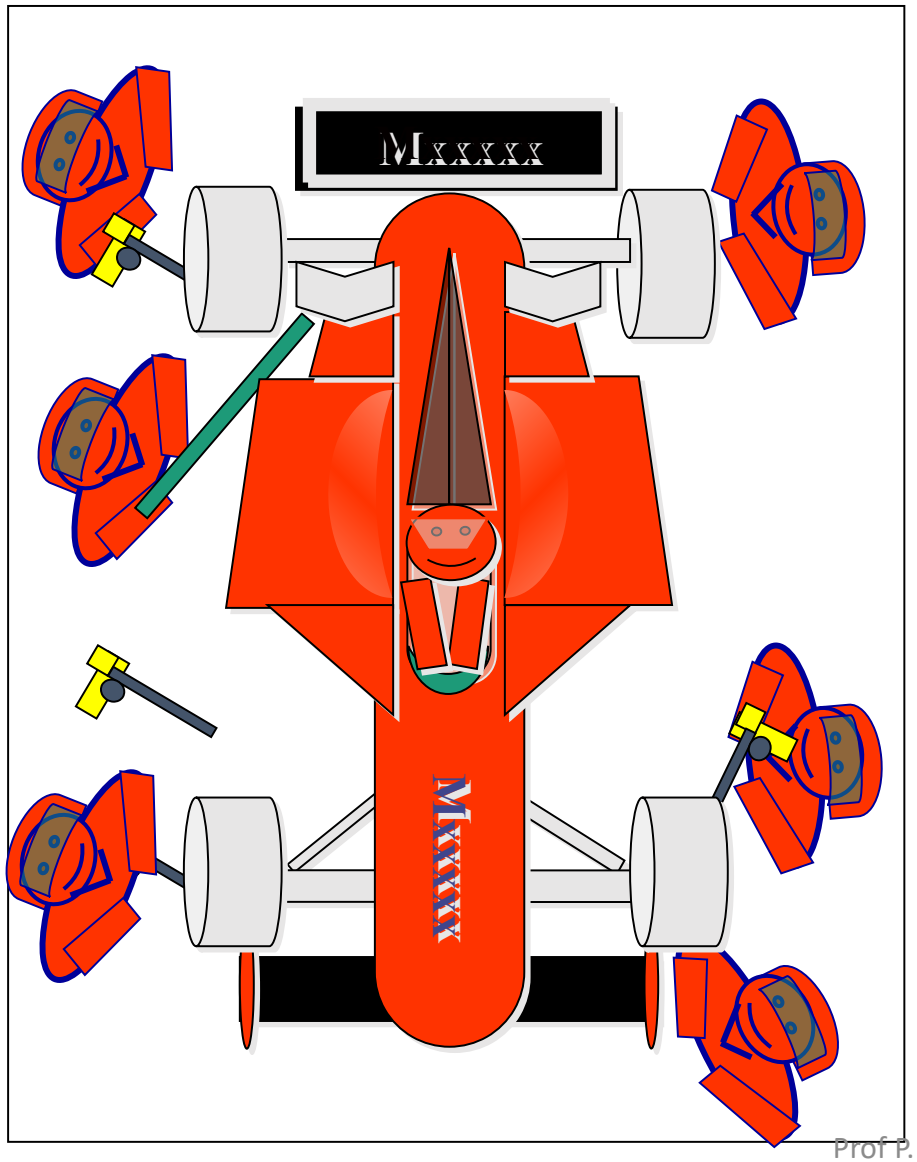
Armonizzare le azioni per evitare interferenze tra i vari operatori

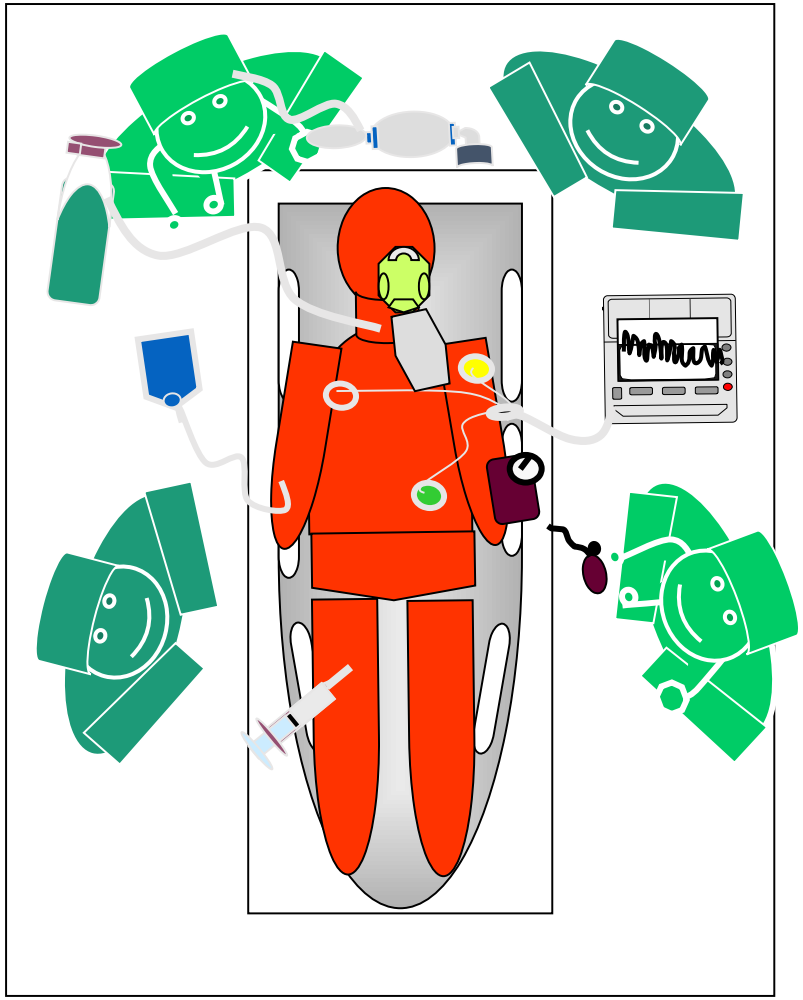
Approccio “VERTICALE” Vs Approccio “TRAVERSALE”





Pit-Stop Team Vs Emergency Team





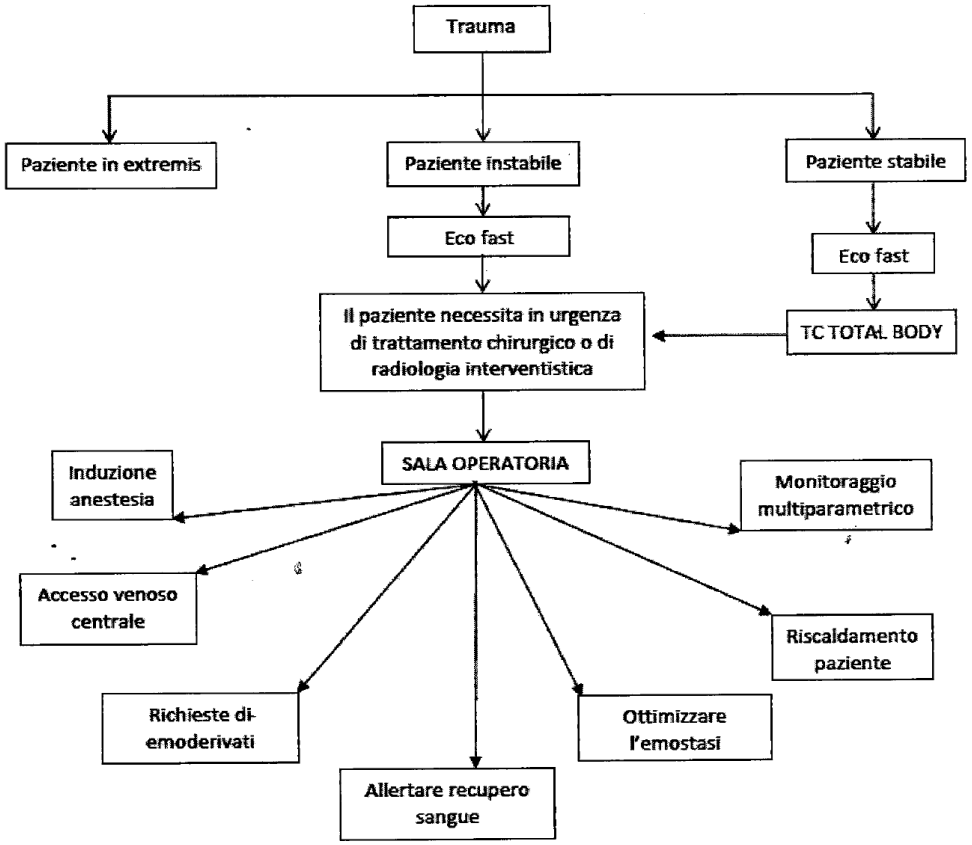
Gestione regionale – A.O. San Camillo Forlanini

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

SISTEMA SANITARIO REGIONALE AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI — REGIONE LAZIO

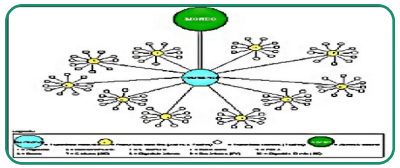
PDTA Cod. Doc.: 901/PDTA/21/02	PERCORSO DIAGNOSTICO TERAPEUTICO ASSISTENZIALE DEL PAZIENTE CON TRAUMA GRAVE (POLITRAUMA)	Rev. 00 del 22/07/2021 Pag. 1 di 173

6.14 Azioni Sala Operatoria



Gestione del trauma grave – dalla DCS alla formazione continua

Un po' di storia



Organizzazione

Innovazione e tecnologia

Strategie chirurgiche – Damage Control

Formazione

Innovazione e tecnologia

Watanabe *et al. World Journal of Emergency Surgery* (2021) 16:34
https://doi.org/10.1186/s13017-021-00377-w

World Journal of Emergency Surgery

RESEARCH ARTICLE Open Access

Hybrid emergency rooms reduce the requirement of blood transfusion in patients with severe trauma

Mfact

Modified Focused Assessment CT

- Intracranial Bleeding
- Pericardial Effusion
- Mediastinal Hematoma
- Massive Hemothorax
- Pneumothorax
- Massive Lung Contusion
- Multiple Rib Fractures
- Abdominal Bleeding
- Retroperitoneal Hematoma
- Massive Retroperitoneal Bleeding

Innovazione e tecnologia

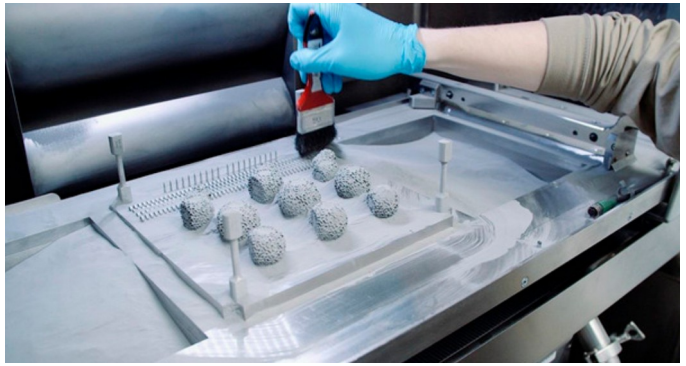
SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

J Am Acad Orthop Surg Glob Res Rev. 2021 Apr; 5(4): e20.00230-11.
Published online 2021 Apr 20. doi: 10.5435/JAAOSGlobal-D-20-00230

PMCID: PMC8059996
PMID: 33877073

Three-dimensional Printing in Orthopaedic Surgery: Current Applications and Future Developments

Colleen M. Wixted, BS, Jonathan R. Peterson, MD, Rishin J. Kadakia, MD, and Samuel B. Adams, MD



J Orthop Trauma. 2020 May;34(5):e181-e186. doi: 10.1097/BOT.0000000000001708.

Advances in the Preoperative Planning of Revision Trauma Surgery Using 3D Printing Technology

Konstantin Horas [1], Reinhard Hoffmann [1], Miriam Faulenbach [1], Simon M Heinz [1], Alexander Langheinrich [2], Uwe Schweigkofler [1]

Affiliations + expand

PMID: 32304565 DOI: 10.1097/BOT.0000000000001708

Innovazione e tecnologia

Review > Injury. 2004 May;35(5):474-8. doi: 10.1016/j.injury.2003.07.002.

Minimally invasive surgery in trauma: technology looking for an application

Elias Degiannis [1], Douglas M G Bowley, Martin D Smith

Affiliations + expand

PMID: 15081324 DOI: 10.1016/j.injury.2003.07.002

World J Surg (2013) 37:113–122
DOI 10.1007/s00268-012-1790-y

World Journal of Surgery

Role of Laparoscopy in Penetrating Abdominal Trauma: A Systematic Review

Eimer O'Malley · Emily Boyle · Adrian O'Callaghan · J. Calvin Coffey · Stewart R. Walsh

….screening, ruolo diagnostico e terapeutico in caso di sospetta lesione del diaframma

SJS SCANDINAVIAN JOURNAL OF SURGERY

Original Research Article

LAPAROSCOPY FOR BLUNT ABDOMINAL TRAUMA: A CHALLENGING ENDEAVOR

M. Z. Koto[1], O. Y. Matsevych[1], F. Mosai[1], S. Patel[1], C. Aldous[2], M. Balabyeki[1]

[1]Department of Surgery, Dr George Mukhari Academic Hospital, Sefako Makgatho Health Sciences University, Pretoria, South Africa
[2]University of KwaZulu-Natal, Durban, South Africa

…..in pazienti selezionati

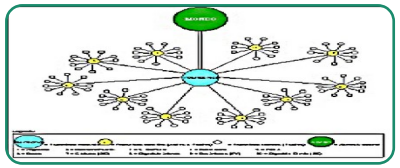
….. Per identificare lesioni intestinali

….difficile se plurime lesioni addominali

….skill laparoscopiche necessarie

Gestione del trauma grave – dalla DCS alla formazione continua

Un po' di storia



Organizzazione

Innovazione e tecnologia

Strategie chirurgiche - Damage Control

Formazione

DCS – Dalla Marina Militare alla Sala Operatoria

BRITISH MEDICAL JOURNAL

LONDON SATURDAY MAY 5 1945

SOME APPLICATIONS OF THE SURGICAL LESSONS OF WAR TO CIVIL PRACTICE

BY

W. H. OGILVIE, M.Ch., F.R.C.S.

Major-General

Now that the European phase of the second world war appears to be entering its final stages, it may be well to consider briefly what war has taught surgery and what it has taught surgeons, and how the lessons learned in the field can be applied to the teaching and practice of surgery in civil life.

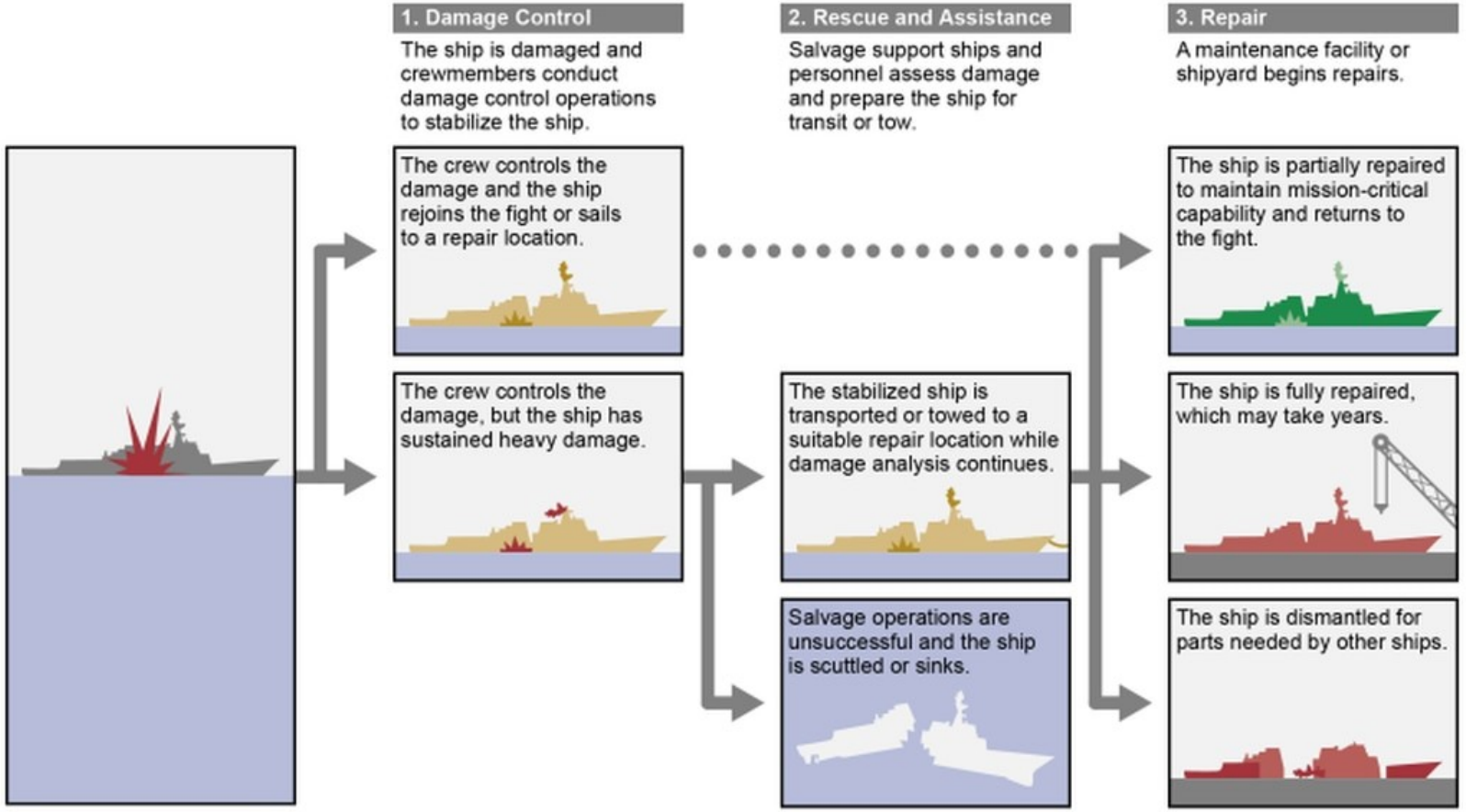
The surgery of wounds in this war has passed through three phases. In the first, treatment by the closed plaster method was the rule; in the second, which was a period of long communications and poor supplies, wounds were excised and drained, the limb was immobilized in a padded plaster case or some form of plaster box splint, and closure by secondary suture or skin grafting was attempted about the third week, or as soon as the surface was covered with healthy granulations; in the third phase, which has been helped by the advent of penicillin, the wounds are excised by the forward groups and closed by delayed primary suture at the base between the fourth and the sixth day.

These successive steps should be regarded as a gradual evolution to meet changing circumstances rather than as an advance in method due to surgical enterprise. Each step was the right one at the time. The closed plaster method is safe and gives excellent results under desperate conditions, when the wounded arrive in numbers too great to allow frequent supervision after operation. Free drainage, immobilization without constriction of purely surface injuries, war wounds can never be rendered entirely healthy and entirely sterile by surgical toilet. The limits of tissue damage cannot be decided with any accuracy, and bacteria, blasted in by the cushion of air that precedes the projectile or displaced along tissue planes by movements of the limb, may lie well outside the visible confines of the wound track. Where the bacteria are few and the remaining damaged tissues small in amount, the defences of the body will soon turn out the invaders unless they are hindered by tension. In a sutured wound the hyperaemia which should give protection is limited by the unyielding surroundings and finally replaced by ischaemia, and the outpouring of defensive fluids is brought to a standstill when the interstices of the wound are filled; the bacteria, on the other hand, find in the trapped discharges an ideal pabulum and in the anoxic tissues an easy prey.

The wounds of road and industrial accidents are, like those of war, lacerated and contaminated, though they never show the extreme devitalization that is a fundamental factor in the pathology of wounds caused by modern weapons, nor are they often contaminated to the same extent. Nevertheless the same problems are present in each, and methods which have been found to confer safety and give good results in war wounds should be safer and better in the traumatic surgery of peace-

Coniato negli USA > capacità di una nave di mantenersi a galla dopo aver subito un grave danneggiamento

Figure 1: The Navy Process for Repairing Ships Damaged in Battle



Source: GAO analysis of Department of Defense information. | GAO-21-246

DAMAGE CONTROL SURGERY

•**1908 Pringle** J: Notes on the arrest of hepatic hemorrhage due to trauma. Ann Surg 1908

• **1978 Calne** R, McMaster P, Pentlow B: The treatment of major liver trauma by primary packing with transfer of the patient for definitive treatment. Br J Surg 1978

•**1983 Stone** H, Strom P, Mullins R: Management of the major coagulopathy with onset during laparotomy. Ann Surg 1983;197:532– 535.

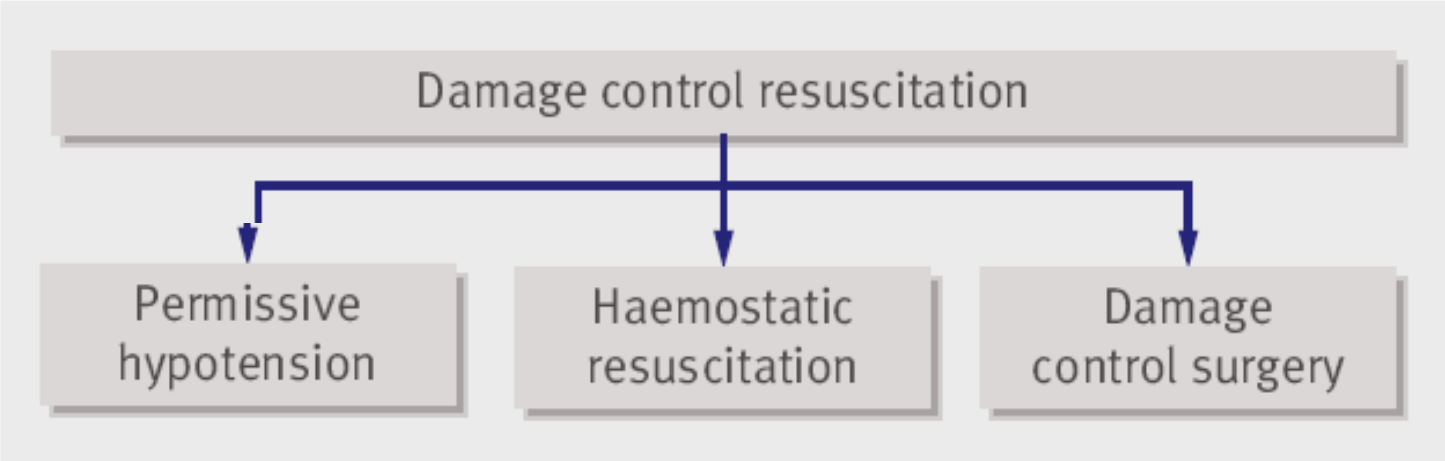
•**1992B Burch** JM, Ortiz VB, Richardson RJ et al: Abbreviated laparotomy and planned reoperation for critically injured patients. Ann Surg 1992;215:476–484. 10

•**1993 Rotondo** MF, Schwab CW, McGonigal MD et al: **"Damage control."** An approach for improved survival in exsanguinating penetrating abdominal injury. J Trauma 1993;35

DCS – Dalla Marina Militare alla Sala Operatoria

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

Strategia di trattamento che mira al contenimento dell'emorragia



Chirurgia fisiologica

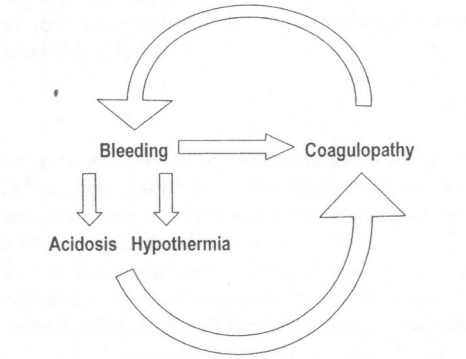


Fig. 1. The bloody vicious cycle.

Damage control resuscitation for patients with major trauma

BMJ | 13 JUNE 2009 | VOLUME 338

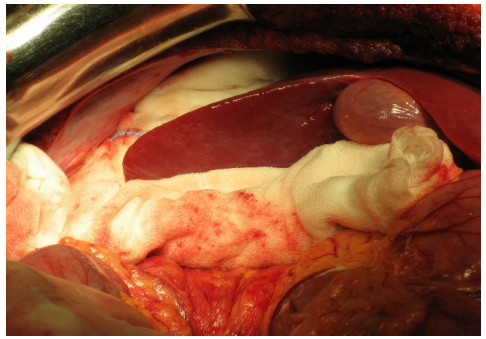
DCS – Dalla Marina Militare alla Sala Operatoria

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

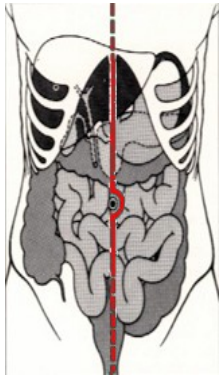
Emergency Department

Life Saving Procedure
Decision Making

FIRST STEP



Operating Room
Laparotomy
Control Bleeding/Contamination



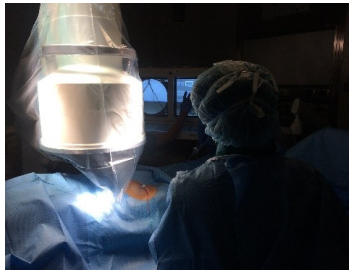
SECOND STEP

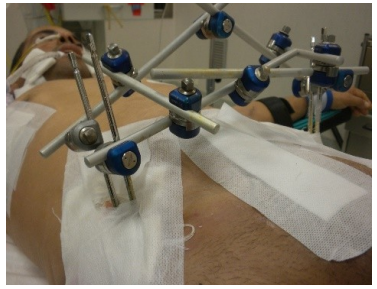
ICU
Correction HAC
Control associated lesions

THIRD STEP

Depacking
Definitive Care of lesions

DCS – Dalla Marina Militare alla Sala Operatoria



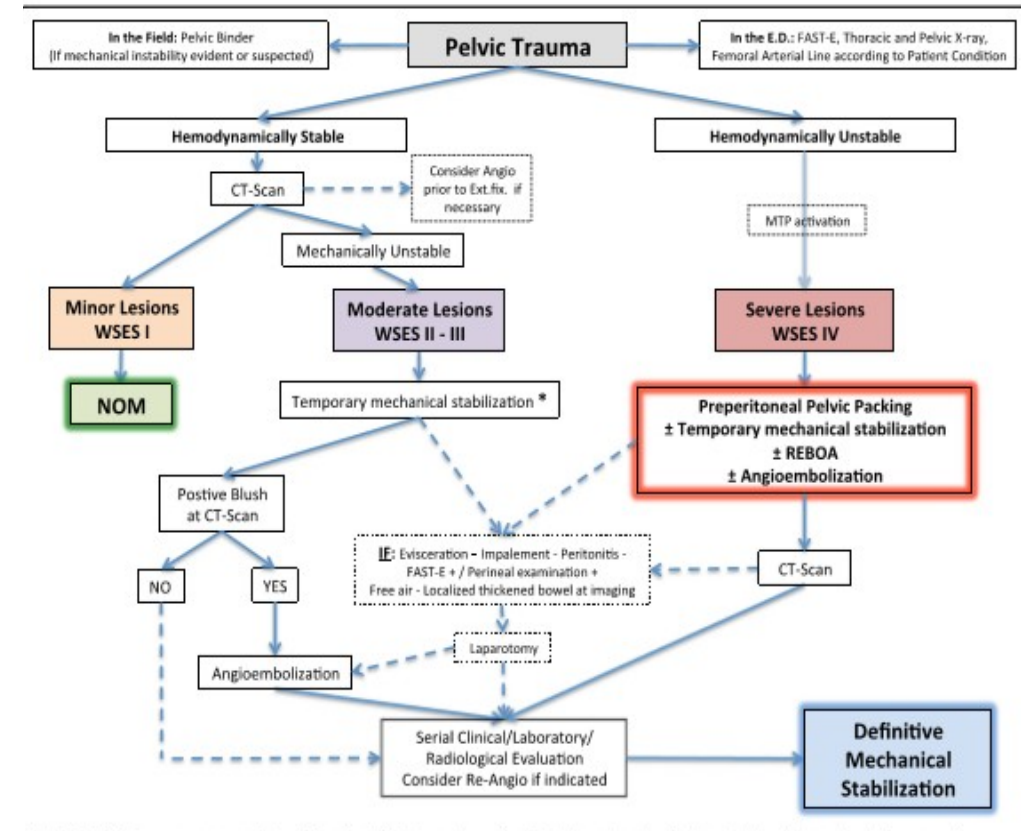


Coccolini et al. World Journal of Emergency Surgery (2017) 12:5
DOI 10.1186/s13017-017-0117-6

World Journal of Emergency Surgery

REVIEW Open Access

Pelvic trauma: WSES classification and guidelines



DCS – La chiusura temporanea dell'addome

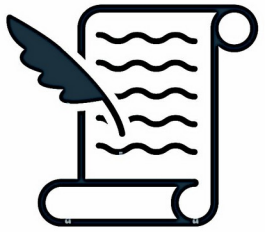
Coccolini *et al. World Journal of Emergency Surgery* (2018) 13:7
DOI 10.1186/s13017-018-0167-4

World Journal of Emergency Surgery

REVIEW Open Access

The open abdomen in trauma and non-trauma patients: WSES guidelines

Technique for temporary abdominal closure	Negative pressure wound therapy with continuous fascial traction should be suggested as the preferred technique for temporary abdominal closure (Grade 2B).
	Temporary abdominal closure without negative pressure (e.g. Bogota bag) can be applied in low resource settings accepting a lower delayed fascial closure rate and higher intestinal fistula rate (Grade 2A).
	No definitive recommendations can be given about temporary abdominal closure with NPWT in combination with fluid instillation even if it seems to improve results in trauma patients (Not grades).



HISTORY

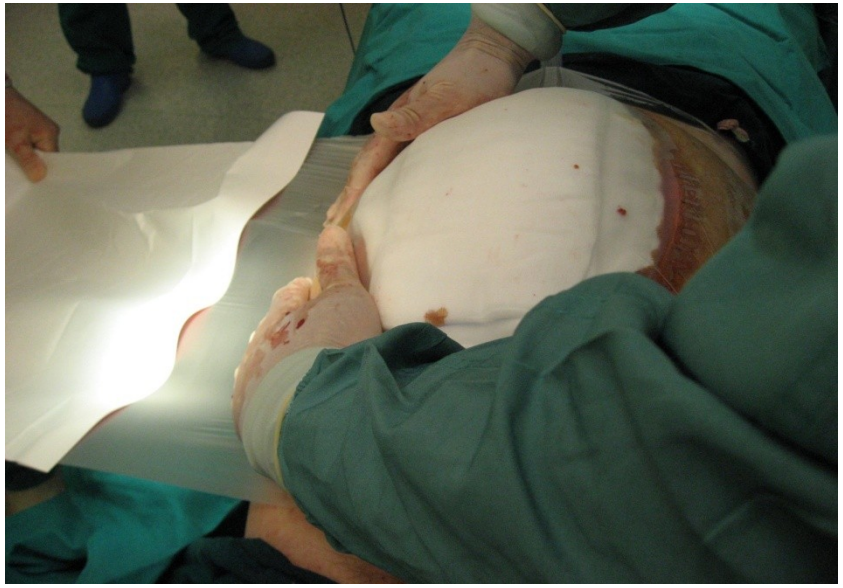
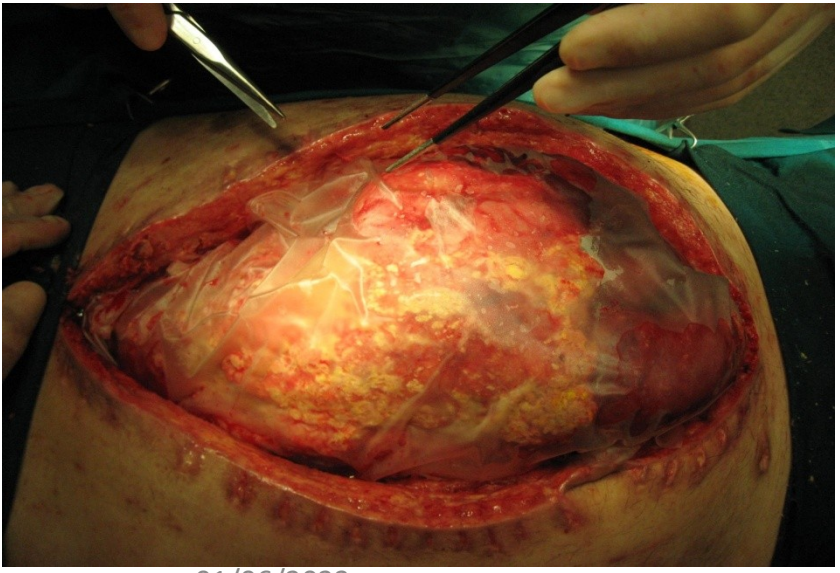
I Generation '90 Bogota Bag (Oswaldo Boarrez) Plastic bag

II Generation 1995 Vacuum pack technique (Barker)

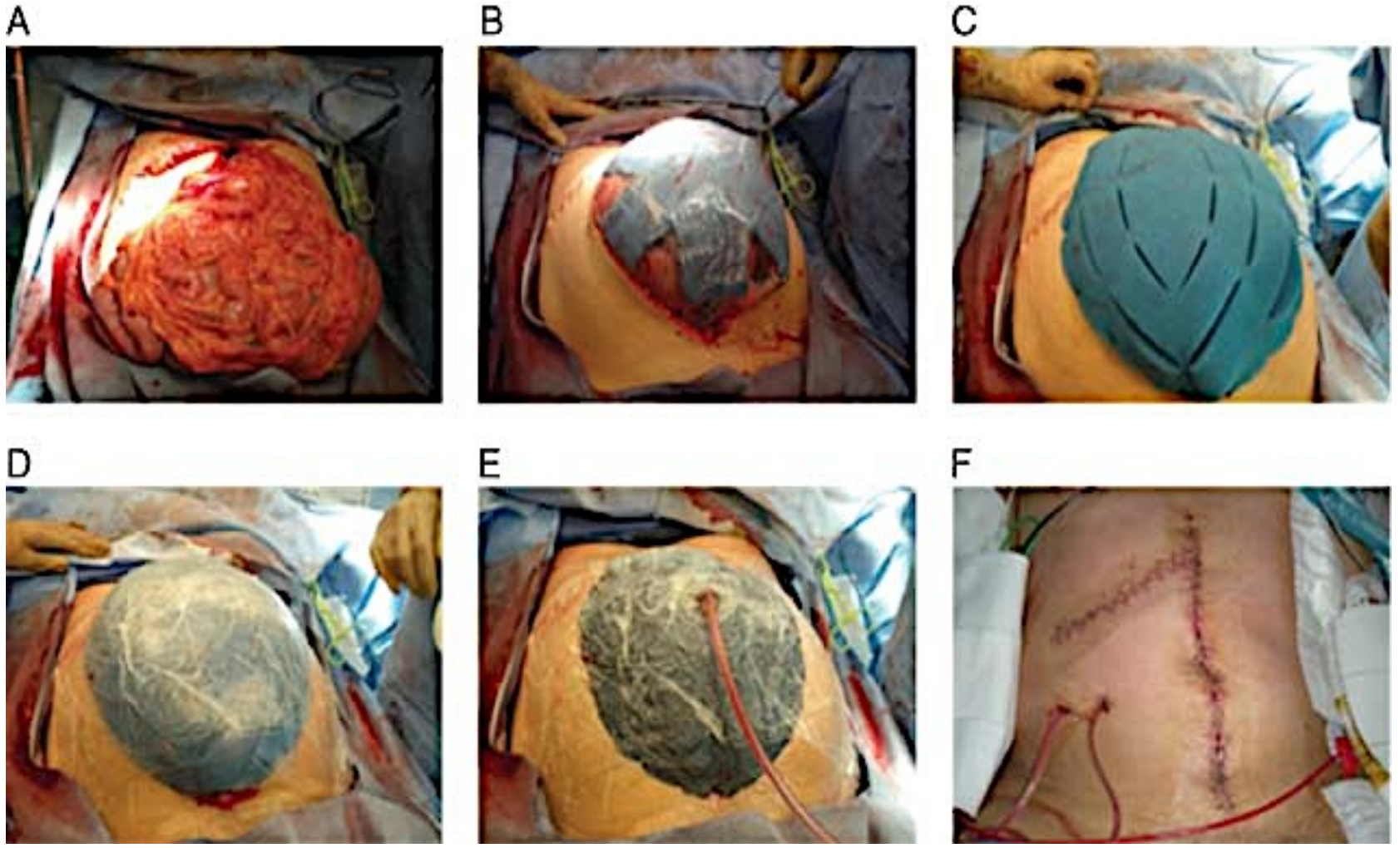
III Generation 2004 Negative Pressure Wound Therapy (NPWT) Stone

DCS – La chiusura temporanea dell'addome

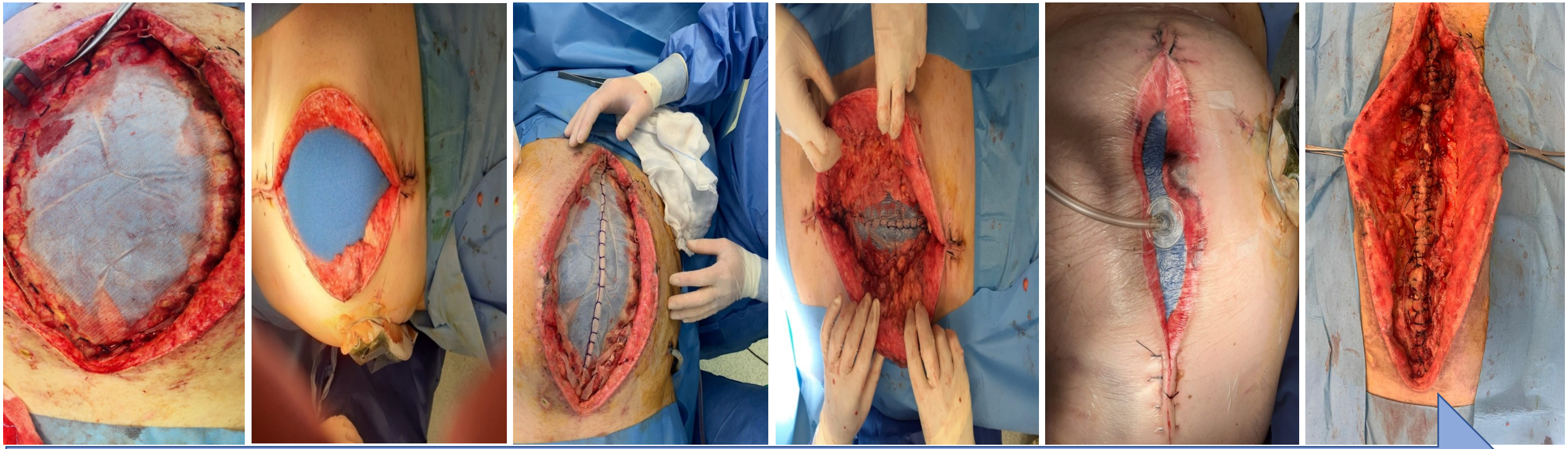


DCS – La chiusura temporanea dell'addome- NPT



DCS – La chiusura definitiva dell'addome- Mesh



POD: O II IV VI VIII

Le conseguenze dell'Open Abdomen…

Leak: Liquidi
Proteine
Riduzione temperatura corporea

Retrazione dei margini (fascia e cute)

Frozen abdomen

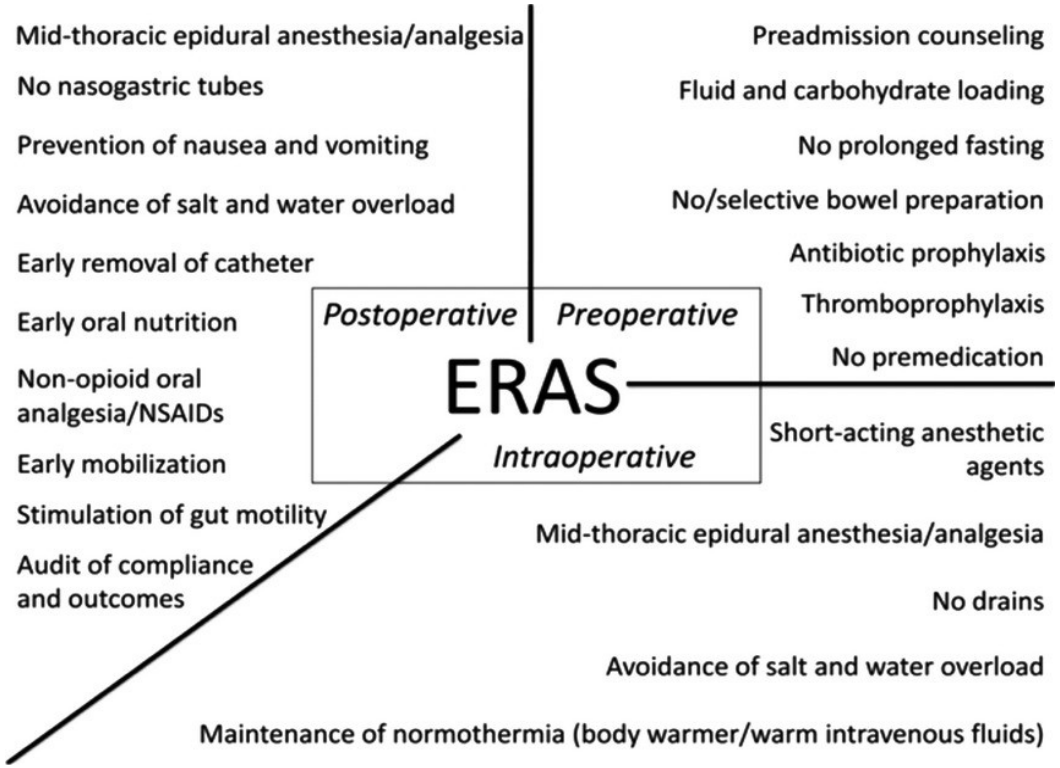
Fistole entero-atmosferiche

Grade	Description
IA	Clean, no fixation
IB	Contaminated, without fixation
IC	Enteric leak, no fixation
IIA	Clean, developing fixation
IIB	Contaminated, developing fixation
IIC	Enteric leak, developing fixation
IIIA	Clean, frozen abdomen
IIIBIV	Contaminated, frozen abdomen
	Established enteroatmospheric fistula, frozen abdomen

Bjork Classification 2016

From ERAS to ERAST

Enhanced Recovery After Surgery- Trauma



Acta Anaesthesiol Scand, Volume: 59, Issue: 10, Pages: 1212-1231

Trauma Surgery & Acute Care Open

Enhanced recovery after surgery (ERAS) in patients undergoing emergency laparotomy after trauma: a prospective, randomized controlled trial

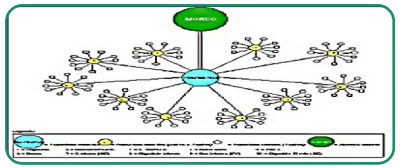
Vijayan Purushothaman [1], Pratyusha Priyadarshini,[1] Dinesh Bagaria,[1] Mohit Joshi,[1] Narendra Choudhary,[1] Abhinav Kumar,[1] Subodh Kumar,[1] Amit Gupta,[1] Biplab Mishra,[1] Purva Mathur,[2] Sushma Sagar [1]

	ERAS group n=30	Standard recovery group n=30	P value
Remove NG tube (days)	1.1±0.1	2.2±0.9	<0.01
Remove catheter (days)	1.1±0.1	3.5±1.6	<0.01
Remove drains (days)	1.0±0.2	3.7±1.6	<0.01
Initiate liquids (days)	1.1±0.1	2.3±1.0	<0.01
Initiate solids (days)	2.1±0.1	3.6±1.3	<0.01
Time to flatus (days)	2.0±0.9	1.6±0.6	0.06
Time to defecation (days)	2.4±1.0	2.1±0.9	0.15
Pain at 24 hours	3.7±1.5	3.8±0.9	0.54
Pain at 48 hours	3.2±1.0	3.2±1.1	0.87
Epidural analgesia (n) (%)	19 (63)	9 (30)	0.01
NSAID (n) (%)	28 (93)	20 (67)	0.02
DVT prophylaxis (n) (%)	30 (100)	21 (70)	<0.01
Duration of hospital stay (days)	3.3±1.3	5.0±1.7	<0.01
30-day readmission (n) (%)	02 (7)	03 (10)	0.99
Complication rate (n) (%)	08 (27)	07 (23)	0.99

DVT, deep vein thrombosis; ERAS, enhanced recovery after surgery; NG, nasogastric; NSAID, non-steroidal anti-inflammatory drug.

Gestione del trauma grave – dalla DCS alla formazione continua

Un po' di storia



Organizzazione

Innovazione e tecnologia

Strategie chirurgiche

Formazione

L’importanza della formazione: aggiornamenti

Numero dei traumi in riduzione – Come fare formazione??

- Affiancamento in chirurgia dei trapianti
- Realtà virtuale – training in sala rossa

Gestione del trauma grave – dalla DCS alla formazione continua

- Protocolli

⇩

Debriefing

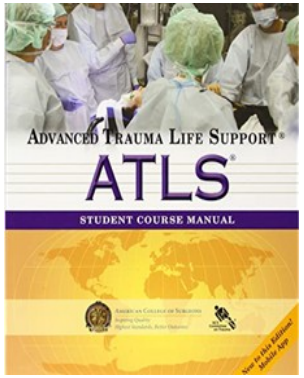
⇩

Audit

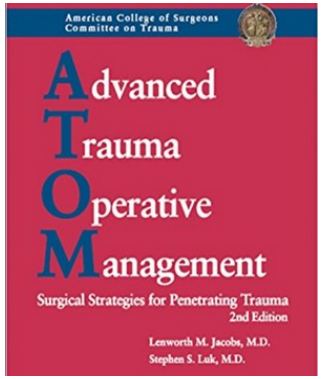
L'importanza della formazione: corsi e società scientifiche

SISTEMA SANITARIO REGIONALE
AZIENDA OSPEDALIERA SAN CAMILLO FORLANINI

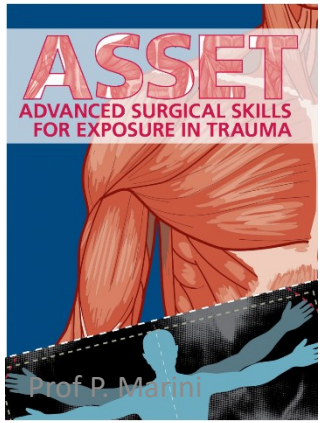
ATLS
Advanced Trauma Life Supprot
ETC
European Trauma Course



DSTC
Definitve Surgical Trauma Care
ATOM
Advanced Trauma Operative Management



ASSET
Advanced Surgical Skills
Exposure Trauma



POCUS
Point-Of-Care Ultrasound

aoi Scuola Nazionale Ospedaliera di Chirurgia

AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes
100+years

- AUDIT
- MEETINGS
- REFRESHES

L’importanza della formazione – Corsi aziendali

Corso aziendale medico infermieristico – scenari di gestione di primi 30 minuti

Conclusioni

- Epidemiologia in evoluzione – numeri e diretta conseguenza sulla formazione
- Necessità di aggiornamento tecnologico delle strutture
- Formazione continua attraverso corsi, meeting ed audit

Grazie dell'attenzione