

**Emergency Preparedness and Trauma Prevention
Technique Symposia and Workshops**

急診和創傷醫療技能研討會暨工作坊

2020.7.10-12





手外傷的預防與治療

李衛平 骨科院士

“手”是什麼？

使人具有高度智慧的三大重要器官

- 大腦**：處理手眼傳來的信息
- 眼**：感受到三維空間，大腦80%的信息來源
- 手**：傳遞信息、執行大腦指令

手運動的大腦支配區域 (%)

大腦頂部的中央前回是軀體運動中樞，定位的大小與軀體各部分動作複雜程度或複雜程度比例。其中面積最大的是人的手，其中拇指和手腕占更大的比例。手指的靈活程度主要取決於控制系統即大腦中支配該手指的區域大小。

手感覺的大腦處理部位的相對比例 (%)

第一軀體感覺皮層的感覺分布

重要的身體部位在大腦地圖上佔更大位置。這反映了手與身體其他部位佔受覺處理的大腦部位的相對比例。

手感覺的大腦處理部位的相對比例 (%)

這個人形形象展示了與身體其他部位感覺處理的大腦部位的相對比例。注意占其巨大的手和面部。

“手”是什麼？(社會學意義)

本身是工具？並能創造工具和使用工具

樂手/歌手/球手/跑手/車手/槍手/狙擊手/水手/選手/棋手/對手/助手/第一把手/扒手/黑手/兇手/

“手”=人

人的手和某些相關祖先形式的相對比例

具有非典型靈敏的人

拇指對掌--人類進化的里程碑

亞特蘭提斯編撰的《世界史》，序章“人類的起源”中，他提出一個很有趣的說法：人類之所以有異於其他動物之處，是因為人類的大拇指能自由地屈成直角的角度，而正是這一獨特功能使人類得以可以製造和操縱複雜的工具和儀器，進化成人類。

你的拇指有多重要？How Important Are Your Thumbs?

觀察您的手。移動拇指和其他手指。拇指不像其他手指那樣運動。拇指與其他手指分開，這使您可以保持物體。

手外傷情況嚴峻

由於手的特点，受損的機會很多。文獻提到需處理的每3起人身傷害事故中就有1起累及手部。

根據美國勞動統計局BLS的數據，在2015年，手部受傷排名第二，僅次於在工作場所受傷中的腰部受傷。

根據職業安全與健康管理局OSHA的統計數據，在當今工作場所和政府機構的145,000起可記錄的傷害中，其中63%的手外傷是由割傷造成的，另外18%的人是撞擊和骨折。

在英國，手外傷佔急診部門所有報告的20%。

骨科分專業 術業有專攻—手外科

手外科是首先按部位和器官獨立出來的骨科亞專科，如眼科一樣，一個器官一個專科。

支撐手外科的學科

手外科處理的各種組織

“一指揮”功力與手外科範圍

手外傷治療需要系統的手外科訓練

中國手外科專業的開拓者、奠基人，有“中國手外科之父”之稱。1959年，在北京頤和醫院創建了我國第一個手外科專科。

王澍宏院士

澳門手外科

澳門手外科的發展現狀

澳門手外科特點：人員匱乏、分工不明確

手的檢查---外觀

手的檢查---外觀

手的檢查---體位

什麼因素會導致手休息位的改變？

皮膚 肌腱肌肉 骨關節 神經

手的檢查---運動

DIPJ 遠側指間關節 PIPJ 近側指間關節

手的檢查---感覺

手的各種神經支配區域

https://www.kenhub.com/en/library/anatomy/the-median-nerve

手的檢查---感覺

手指的兩點辨覺

身體不同部位的兩點辨覺

斷指(肢)再植---多種組織的修復

示指斷指

斷指(肢)再植---多種組織的修復

示指斷指

WOUND CARE AND SCAR MANAGEMENT

DR. CHAN SI UN, ANGE



MACAU UNIVERSITY HOSPITAL OF SCIENCE AND TECHNOLOGY

SPEAKER: Dr. Chan Si-Un, Ange 陳恩儀醫生

- 澳門科大醫學院皮膚科醫生
- 澳門燒傷學會執委會委員
- 澳門燒傷協會學術指導委員會委員
- 燒傷雜誌編委會委員
- 廣東省醫學會合作科急危重症醫學專業委員會委員




目录 CONTENTS

01	02	03	04
Normal Skin Anatomy	Wound Healing	Scar and Keloid	Prevention and Management of Scar and Keloid

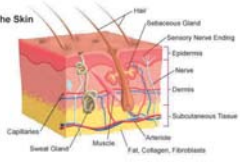


01 Normal Skin Anatomy

AN OVERVIEW OF BASIC CONCEPTS



01. Normal Skin Anatomy



The Skin

- Epidermis:** stratum basale, stratum spinosum, stratum granulosum, stratum lucidum, stratum corneum
- Dermis:** Papillary layer, Reticular layer
- Subcutaneous Tissue:** fatty layer with blood vessels, nerves, lymph, and loose connective tissue

Other structures: Hair, Sebaceous Gland, Sensory Nerve Ending, Arteries, Veins, Capillaries, Sweat Gland, Muscle, Fat, Collagen, Fibroblasts

01. Normal Skin Anatomy

Function of Skin



- Protection:** prevents invasion of the body by bacteria
- Absorption:** facilitates heat loss and cools the body when necessary through evaporation, vasodilation and vasoconstriction
- Sensation:** Composed with nerve endings for "touch" pressure, cold and heat sensation
- Temperature Regulation:** Heat sense received. Signals from sunbathing to reduce vasodilation or dilation, shivering or sweating to regulate body temperature
- Secretion and Excretion:** being regulated by sweat gland, sebaceous gland, mucous gland

02 Wound Healing

What are we doing when we are tackling with wounds.



02. Wound Healing

Wound: Damage to continuity of any tissue due to injury or surgery.



02. Wound Healing

Classification of Wounds

- Clean Wound:** Operative incisional wounds that follow aseptic technique (skin) trauma.
- Clean/Contaminated Wound:** uninfected wounds in which no inflammation is encountered but the respiratory, gastrointestinal, genital, and/or urinary tract have been entered.
- Contaminated Wound:** open, traumatic wounds or surgical wounds involving a major break in sterile technique that show evidence of inflammation.
- Infected Wound:** old, traumatic wounds containing dead tissue and wounds with evidence of a clinical infection (e.g., purulent drainage).

02. Wound Healing

PHASES OF WOUND HEALING

- Stages of wound healing:
 - Hemostasis:** immediate response
 - Inflammation:** 0-4 days
 - Proliferation:** 4-21 days
 - Granulation (epithelialization):** 4-21 days
 - Remodeling:** up to 2 years
- * This is for acute wounds, chronic wounds fail to progress naturally

02. Wound Healing

ACUTE WOUND HEALING



Time scale: Injury Hours Days, Weeks

02. Wound Healing

CHRONIC WOUND HEALING




Time scale: Injury Hours Days, Weeks

Cell types involved:

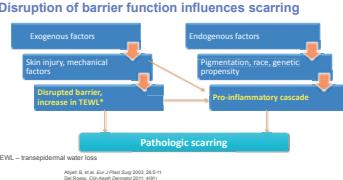
- 血小板 Platelets
- 巨噬細胞 Macrophages
- 纖維母細胞 Fibroblasts
- 內皮細胞 Endothelial cells

02. Wound Healing



02. Wound Healing

Disruption of barrier function influences scarring



*TEM = trans-epithelial water loss

Ng et al. et al. J Invest Dermatol 2003; 121:11

02. Wound Healing

Several factors affect scar formation

- Degree and duration of inflammation
 - Longer and more intense inflammation - poor scar result
- Amount of mechanical tension on the scar
 - High tension areas (back, sternum, deltoid) - predispose to hypertrophic scarring
- Age
 - Younger individuals have increased intensity of inflammation - poor scar result
- Race/genetic predisposition
 - Scarring is worse in darkly pigmented individuals
 - Worse in people of African, Hispanic or Asian descent
 - Keloid formation is also influenced by genetics

03 Scar and Keloid


What are they?




03. Scar and Keloid

Scars can become abnormal and excessive

Hypertrophic scars



Keloids





03. Scar and Keloid

Basic differences between hypertrophic scars and keloids

Hypertrophic scars (HS)	Keloids
Develop soon after skin injury	Develop months after skin injury; genetic
Usually flatten spontaneously over time	Remain elevated and do not spontaneously flatten
Limited to area of original tissue damage	Overgrow the boundary of the wound.
Related to motion and skin tension	Not related to motion and skin tension
Often occur over joints	Commonly occur on ear lobes, shoulders, chest and upper back
Associated with contractures and limited movement	Not associated with contractures
May respond with appropriate surgery	Usually recur after surgery

03. Scar and Keloid

SCARS CAN AFFECT QUALITY OF LIFE

PSYCHOSOCIAL DISABILITY

- Self-consciousness
- Embarrassment
- Social withdrawal and isolation

PHYSICAL DISABILITY

- Movement restriction
- Functional impairment
- Pain and itching

03. Scar and Keloid

The decision to treat scars depends on:



- Anatomic site of injury
- Symptoms of pain, itching or discomfort
- Degree of functional impairment
- Degree of psychological distress

Any strategy begins with knowledge of cause and mechanism of injury

Treatment requires clinical judgment and weighing of risks and benefits

03. Scar and Keloid

SCAR INCIDENCE IN ASIANS

- The exact incidence is not known with accuracy
- Highly variable depending on the population
- Numerous factors
 - Age
 - Sex
 - Race
 - Degree of pigmentation

03. Scar and Keloid


Epidemiology

- Keloids tend to occur in darker skin
- Incidence of keloid in Blacks, Hispanics, and Asians 4.5% - 16%
- Skin darkness - Indians, Malays > Chinese
- Incidence of keloid: Chinese > Indians, Malays?
- > do not correlate directly

03. Scar and Keloid

Epidemiology

- Keloids occur 15 times more often in dark-skinned individuals compared with whites
- Incidence of keloid in Blacks, Hispanics, and Asians 4.5% - 16%



03. Scar and Keloid

Different skin colours = different scar characteristics

- These characteristics make Asians, even lightly pigmented Asians, more prone to:
 - Scarring
 - Hyperpigmentation
 - Hypopigmentation
 - Prolonged erythema after skin injury

Alternative Wound Closure Techniques

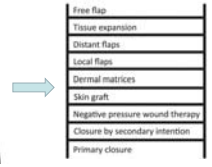
Dr. Fong Cham Wa
Centro Hospitalar Conde de São Januário de Macau
2020/07/11

Disclosure

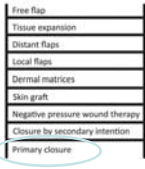
I have NO financial disclosure or conflicts of interest with the presented products or devices mentioned in this presentation.



Represent the spectrum of closure options available for wounds
Serve as a thought paradigm to guide surgeons in choosing method of wound closure



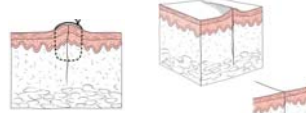
An early version of the reconstructive ladder



- Primary wound closure
 - Direct apposition of skin edges of acute surgical or traumatic wounds after appropriate wound preparation.
- Secondary wound closure
- Tertiary wound closure (Delayed primary)



- Sutures enables meticulous wound closure
 - Layer matching
 - Wound edge eversion
 - Reduced wound tension



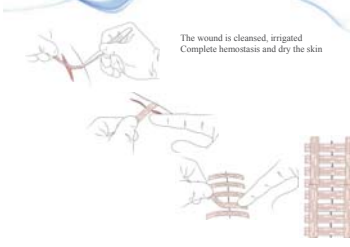
Adhesive Tape

- Have been used in management of surgical wounds for >50 years
 - As adjunctive wound support after staples or sutures are removed
 - In conjunction with buried dermal sutures, or with absorbable running subcuticular sutures in low-tension wounds.



Adhesive Tape

- Rapid application, ease of use, cost effectiveness, lack of visible puncture marks, less tissue reactivity, no need for suture removal.
- Not work well on surfaces that are oily or hair bearing, on joint surfaces, on lax skin, on wounds under tension, or on very young or uncooperative children.



Adhesive Tape

- Difficulty to ensure accurate skin edge apposition and skin edge eversion
- Unacceptable variability and poor reliability in their adhesive properties
- Lose adhesiveness with time -> wound dehiscence
- To secure adhesion of the tape, skin edges must be dry and strict haemostasis
- Use adjunct liquid adhesive, such as (Benzoin 安息香, Mastisol) to increase adhesive strength

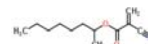
Tissue Adhesives

- First developed in 1949
- Approval for human use by FDA in 1998
- Routinely used in ER for quick laceration closure and also used by surgeons in operating room.



Tissue Adhesives

- Primarily contain cyanoacrylate (氰基丙烯酸酯)
- Cyanoacrylate tissue adhesives are monomers that undergo an exothermic reaction on exposure to moisture (eg, on the skin surface), changing to polymers that form a strong tissue bond
- 2-octyl cyanoacrylate 氧基丙烯酸辛酯, OCA (eg, Dermabond, SurgiSeal)
 - Longer side chain, polymerize slower, stronger bond
- n-butyl-2 cyanoacrylate 氧基丙烯酸正丁酯, BCA (eg, Histoacryl Blue, PeriAcryl)

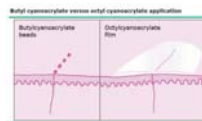


Tissue Adhesives

- Indications
 - Linear (not stellate)
 - Low wound tension (or tension relieved with deep absorbable sutures)
 - Good wound approximation, or can easily approximated
 - Not crossing a joint
 - Not grossly contaminated, not infected
 - Not a result of mammalian bite
 - No chronic condition that might impair wound healing

n-butyl-2 cyanoacrylate, BCA

- BCA polymerize much more quickly than OCA (10s to 15s).
- BCA are more prone to wound dehiscence than OCA, although the risk of dehiscence is low for both agents.
- Application:
 - In discrete drops along the wound margin
 - Only **ONE** single application is required



Tissue Adhesives

- Aftercare and Education
 - NO antibiotic ointment be used
 - May shower but NO soak or scrub the area
 - The adhesive will peel off usually by 5 to 10 days
 - Antibiotic ointment or petroleum jelly can be applied to the wound if the adhesive does not come off on its own



Tissue Adhesives

- Rapid repair time
- Creation of a waterproof and antimicrobial barrier
- No need for suture removal or follow-up
- Absence of risk of needlestick injury

But how about Dehiscence? Wound infection? Scar? Cost?

Tissue Adhesives

- Tensile strength of OCA is similar to 5-0 non-absorbable suture.
- A Cochrane review of 33 RCT of adhesive use in the OR concluded there was no overall difference between adhesives and alternative closure methods in cost, cosmetics, patient and surgeon satisfaction, or infection.
- Adhesives allowed for faster closure time, shorter nursing care time.
- Some evidence, but of low quality, to suggest that sutures were better than tissue adhesives for reducing risk of dehiscence.

Tissue Adhesive + Self-Adhering Mesh

- (Dermabond Prineo; Ethicon Inc.)
 - Combination of 2-octyl cyanoacrylate (2-OCA) and self-adhering mesh
 - Activator for the liquid adhesive located within the tape
 - Does not polymerize until contact with mesh tape, it also gives practitioner longer working time



Tissue Adhesive + Self-Adhering Mesh

- Provides microbial-barrier protection
- Significantly greater skin holding strength than subcuticular 4-0 MONOCRYL® or Ethicon Endo-Surgery skin staples
- Redistributes tension away from the wound to the surrounding healthy surface area
- Patient Satisfaction



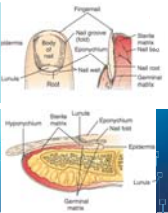
1. Shields C, Gaskill JF, et al. Tissue adhesives for closure of surgical wounds. Cochrane Database for Reviews 2011;1:1040207.
2. Baranstein DW, et al. A prospective, randomized, single-blind study comparing cyanoacrylate adhesives to sutures for wound closure in skin cancer patients. Dermatol Surg 2017;43:1371-6.

WOUND MANAGEMENT IN SPECIAL CONDITION

LEONG HOI YIP

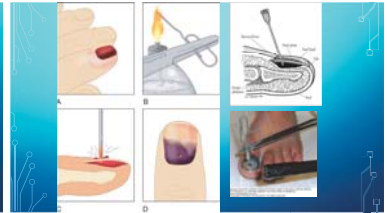
NAIL ANATOMY

甲指解剖圖

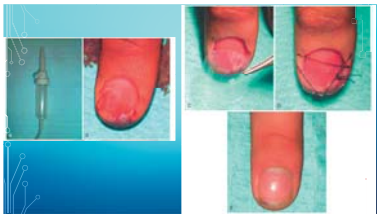
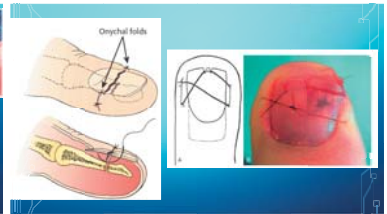


SUBUNGUAL HEMATOMA

- Small nail bed laceration
- Small > no indication to remove the nail
- Large > unstable or avulsed nail

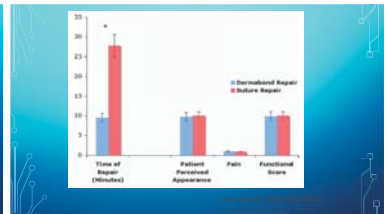


SIMPLE NAIL BED LACERATION

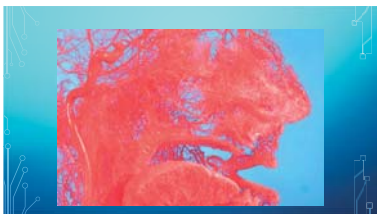
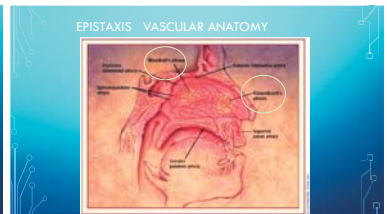


REASON OF NAIL REPLACEMENT

- (1) It acts as a splint or mold to maintain the normal anatomy of the nail bed,
- (2) It covers a sensitive area and facilitates dressing changes, and
- (3) It maintains the fold for new nail growth.



NASAL BLEEDING



MANAGEMENT OF EPISTAXIS

- Identification of the source of bleeding
- Control bleeding

BE CAREFUL OF NPC HISTORY

CALL FOR HELP



DIRECT COMPRESSION



ANTERIOR NASAL PACKING

- Meqocral



Primary and Secondary survey in trauma patient

Dr. Lam Ion Meng
Macau Society of Emergency and Critical Care Medicine
2020-07-12

Primary survey

- Standardized in assessment of all trauma patients
- Two goals:
 - Promptly identify life threats
 - Provide immediate stabilization
- Simultaneous assessment and treatment



Primary survey - ABCDE

- Airway maintenance with restriction of cervical spine motion
- Breathing and ventilation
- Circulation with hemorrhage control
- Disability (assessment of neurologic status)
- Exposure/Environmental control



Airway assessment

- Talking = good (...for now!)
- What if not talking?
 - Ask why not?
 - Unconscious? GCS<8 => intubate
 - Can't phonate?
 - Assume significant airway injury => get emergent airway



Airway life threats

- Face/neck injuries – Look for...
 - Swelling – hematoma or edema can compress airway
 - Bleeding – nasopharyngeal blood cause aspiration risk
 - Crepitus – suggests direct laryngeal or tracheal injury



Airway life threats

- C-spine injuries – immobilize C-spine!
 - High C-spine injury will impair respiratory drive (C3-C5)



Airway life threats

- Burns
 - Thermal injury can cause airway edema.
 - Inhalational injury can cause pulmonary damage and hypoxia.



Airway management

- Intubate whenever airway compromise is present or imminent
- Be prepared for difficult airway
- Maintain spinal immobilization
- Surgical airway may be required with severe face/neck injury



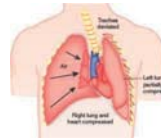
Breathing assessment

- Listen – equal bilateral breath sounds
- Look – gestalt respiratory effort, note injuries
- Count – respiratory rate
- Monitor – oxygen saturation



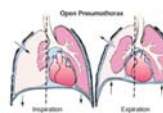
Pulmonary life threats

- Tension pneumothorax
 - Treatment:
 - Needle decompression



Pulmonary life threats

- Open pneumothorax
 - Treatment:
 - Occlusive dressing



Pulmonary life threats

- Flail chest
 - Treatment:
 - Supportive (intubate, ventilate)



Pulmonary life threats

- Massive hemothorax
 - Treatment:
 - Tube thoracostomy



Breathing management

- Supplemental oxygen – titrate to SpO2 >95%
- Emergent treatment is based on underlying injury
- CXR can be used only once patient is stabilized



Circulation assessment

Look	Feel peripheral pulse strength (mmHg)	Monitor
Color	Carotids - SBP>60	Pulse
Level of consciousness	Femoral - SBP>70	Blood pressure
Capillary refill	Radial - SBP>80	
External bleeding	Dorsalis pedis - SBP>90	

Circulatory life threats

- Hemorrhagic shock => localize/control bleeding
- Obstructive shock
 - Cardiac tamponade => pericardiocentesis
 - Tension pneumothorax => needle decompression



Circulation management

- Control external hemorrhage with direct pressure
- Ensure adequate IV access (2 large-bore peripherals, IO, or "central line")
- Use isotonic crystalloid vs. blood transfusion
- Emergent treatment is based on underlying injury



Anterior/Posterior	CLASS I (15-30%)	CLASS II (30-40%)	CLASS III (40-60%)	CLASS IV (>60%)
Heart rate	Normal	Normal	Normal	Normal
BP	Normal	Normal	Normal	Normal
RR	Normal	Normal	Normal	Normal
SpO2	Normal	Normal	Normal	Normal
Urine output	Normal	Normal	Normal	Normal
Level of consciousness	Normal	Normal	Normal	Normal
Diagnosis	Normal	Normal	Normal	Normal
Management	Normal	Normal	Normal	Normal

Disability assessment

- Level of consciousness (GCS)
- Pupillary function
- Four-extremity movement
- External signs of head/neck trauma
- Check glucose



Neurological life threats

- Penetrating cranial injury
- Intracranial hemorrhage
- Diffuse axonal injury
- High spinal cord injury



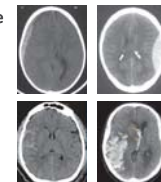
Disability management

- If GCS<8 => intubate for airway protection
- Supportive care is used to optimize oxygenation and perfusion
- Emergent cranial imaging includes non-contrast head CT



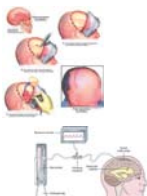
Intracranial hemorrhage

- Subdural hematoma
- Epidural hematoma
- Subarachnoid hemorrhage
- Intraparenchymal or intraventricular hemorrhage



Disability management

- Emergent management is based on CT findings
 - Subdural/Epidural hematoma => surgical evacuation
 - Subarachnoid/Intraparenchymal hemorrhage => manage intracranial pressure, supportive care



Exposure / Environment

- Remove all clothing/coverings
- Avoid hypothermia

