

Ultrasound Technique Symposia and Workshops 超聲波技能研討會暨工作坊

2020.8.8-10



The Thyroid Gland

Dr. CHAO WAI IENG

Anatomy

Location:
anterior neck
(superficial structure)

Transducer:
linear
(7-15MHz)

Position:
supine
Hyperextending the neck



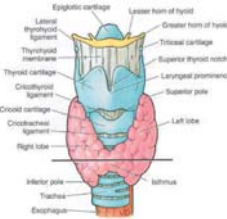
Anatomy

Usually

Left & right lateral lobes and the thin isthmus.

The superior border begins at approximately the thyroid cartilage.

The lobes over the second and third cartilaginous rings of the trachea.



Anatomic variations



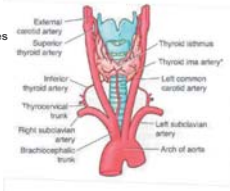
1. Bilateral lobes with isthmus
2. Bilateral lobes with isthmus and pyramidal lobe
3. Bilateral lobes without isthmus
4. Bilateral lobes with pyramidal lobe, without isthmus
5. Unilateral lobe

Anatomy

Superior thyroid arteries

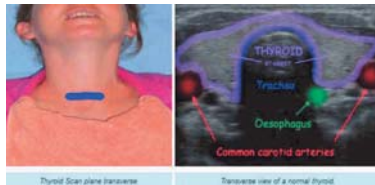
Inferior thyroid arteries

Thyroid ima artery (variation)



Normal Thyroid

AP + Ts



Normal Thyroid



Normal Thyroid

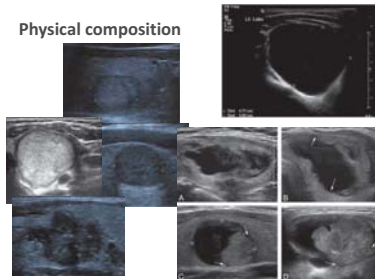
AP + CC



Diagnostic sonography of THYROID

- 1. Location
- 2. Size
- 3. Sonographic characteristics
 - (1) Physical composition
 - ★Cystic ★Solid ★Complex
 - (2) Pathology composition
 - ★mass ★Thyroiditis ★haemorrhagic ★calcification
 - (3) Vascularity
 - ★CDFI ★PW

Physical composition



Pathology of thyroid gland

Thyroiditis and diffuse thyroid disease

Thyroid benign lesions

Thyroid malignant lesions

Thyroiditis and diffuse thyroid disease

Multinodular Goiters

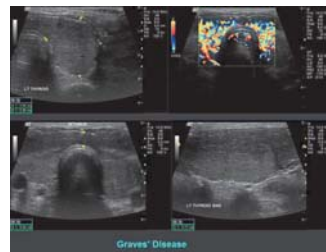
Graves disease

Thyroiditis

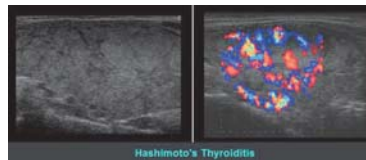
Multinodular Goiter



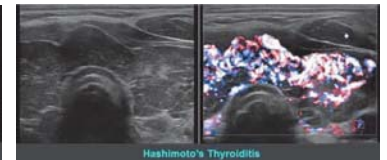
Graves disease



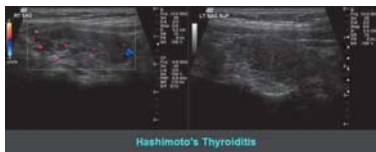
Thyroiditis



Thyroiditis



Thyroiditis



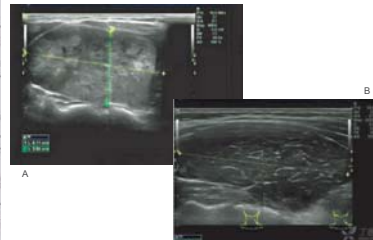
Grave's disease

VS

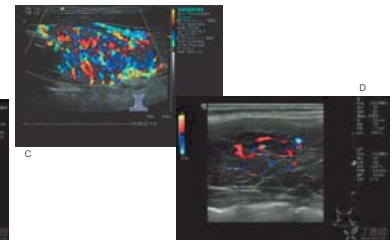
Hashimoto's Thyroiditis

鉴别点	Graves病	Hashimoto甲状腺炎
甲状腺大小	甲状腺肿大	甲状腺肿大、萎缩或正常大小
甲状腺质地	弥漫性肿大、均匀性肿大	弥漫性肿大、不均匀性肿大
血流	甲状腺内血流丰富，呈火海征	甲状腺内血流减少或消失
钙化	少见	常见
CDFI	甲状腺内血流丰富，呈火海征	甲状腺内血流减少或消失
超声弹性成像	甲状腺弹性减低	甲状腺弹性增高
甲状腺自身抗体	甲状腺自身抗体阳性	甲状腺自身抗体阳性

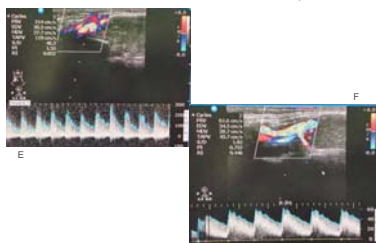
Grave's disease VS Hashimoto's Thyroiditis



Grave's disease VS Hashimoto's Thyroiditis



Grave's disease VS Hashimoto's Thyroiditis



Thyroiditis



Thyroid benign lesions

Non-neoplastic conditions

- A. Simple cysts
- B. Nodular hyperplasia
- C. Foci of thyroiditis

Neoplasms

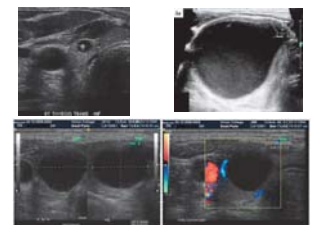
Adenomas (Follicular adenomas)

1. Colloid variant
2. Embryonal
3. Fetal
4. Hurtle cell variant

Teratoma

Others: dermoid cysts, lipomas, hemangiomas

Simple cysts



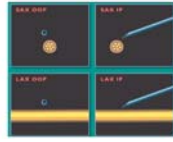
Ultrasound-Guided Injection techniques

Injection procedures for cervical pain
Injection procedures for lumbar pain

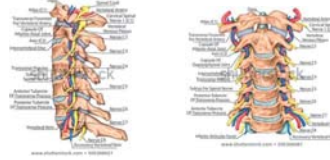
Dr. CHAO WAI WENG

Ultrasound-Guided Injection techniques

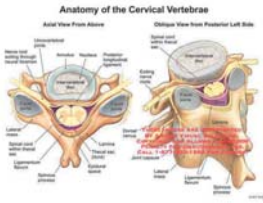
Short axial out of plane
Short axial in plane
Long axial out of plane
Long axial in plane



Cervical spine--Anatomy

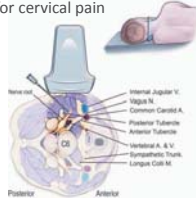


Cervical spine--Anatomy

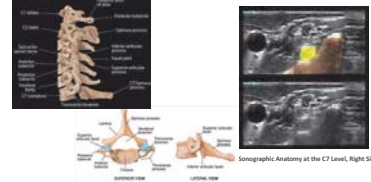


Injection procedures for cervical pain

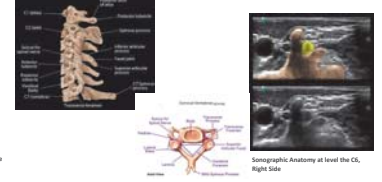
With patients lying in the lateral decubitus position, ultrasound examination is performed using a high-resolution linear array transducer.



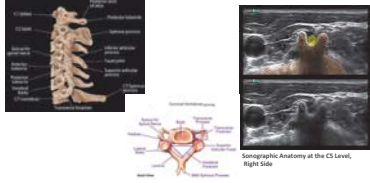
Cervical nerve root



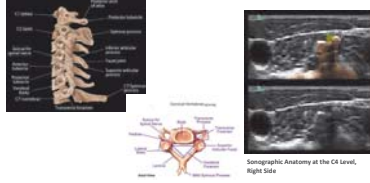
Cervical nerve root



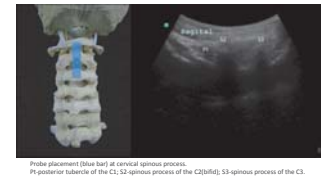
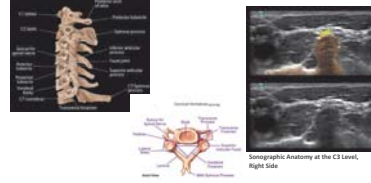
Cervical nerve root



Cervical nerve root



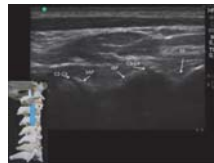
Cervical nerve root



Probe placement (blue bar) at cervical spine process.
P: posterior tubercle of the C1; S: spinous process of the C2(bifid); S3: spinous process of the C3.



Probe placement (blue bar) at facet joints.
SAJ: superior articular process; SAP: superior articular process; S: interarticular space.

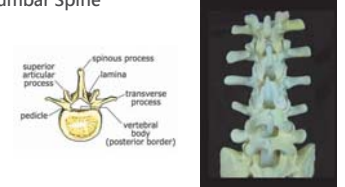


Probe placement (blue bar) at C2-C3 and C3-C4, 2 zygapophyseal joints.
SAP: superior articular process of C3; IAP: inferior articular process of C3; M: medial branch of C4.



MB4, medial branch of C4

Lumbar Spine

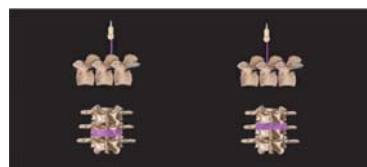


Lumbar Spine

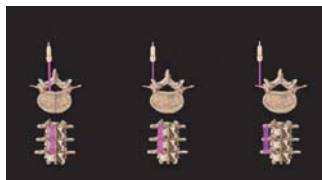
Because the spine is located at a depth, US imaging of the spine typically requires the use of low-frequency ultrasound (5 MHz) and curved array transducers. Low-frequency US provides good penetration but unfortunately, it lacks the spatial resolution at the depth (5-7 cm)



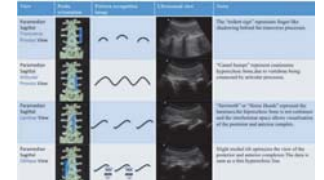
Lumbar Spine—Transverse view



Lumbar Spine—Sagittal view



Lumbar Spine—Sagittal view



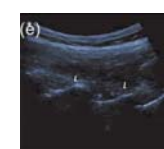
Lumbar Spine—Transverse view



Median sagittal view -- level of spinous processes



Paramedian sagittal laminar view



L: lamina

Paramedian oblique sagittal view -- level of lamina (Showing interlaminar spaces)



ESM, erector spinae muscle;
IS, interlaminar space;
LF, Ligamentum Flavum;
FS, spinal space;
PD, posterior dura;
CL, couda equina;
IFS, intervertebral space;
AC, anterior complex;
VD, intervertebral disc;
L3, lamina of L3 vertebra;
L4, lamina of L4 vertebra;
L5, lamina of L5 vertebra.

Knee and shoulder anatomy

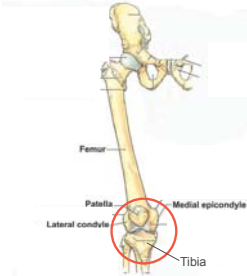
Learning outcomes

- At the end of the talk, learners are expected to be able to:
 - list the main structures in the knee and shoulder
 - describe their anatomical relationships

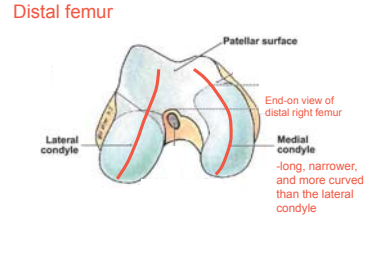
Sources of illustrations

Agnur AMR (ed), 1991 Grant's Atlas of Anatomy, Williams & Wilkins, Baltimore.
 Drake RL, Vogl W, Mitchell AWM, 2005 Gray's Anatomy for students, Churchill Livingstone, Philadelphia.
 Last RJ, 1985 Anatomy Regional and applied, English Language Book Society / Churchill Livingstone, Edinburgh.
 Putz F, Pabst R, 2004 Sobotta Atlas Japoxuuxu Tupu, Peking University Press, Peking.
 Basmajian JV, 1975 Grant's Method of Anatomy, The Williams & Wilkins Company, Baltimore.

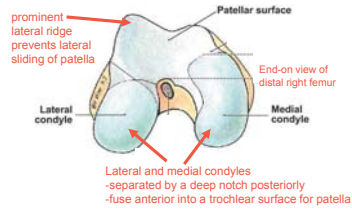
Knee



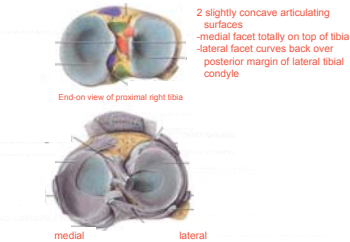
Knee: Bones and ligaments



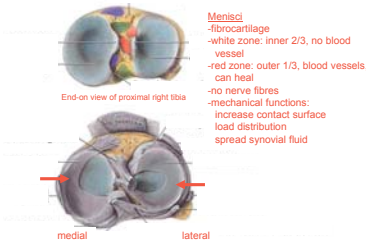
Distal femur



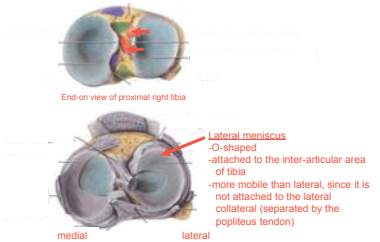
Proximal tibia



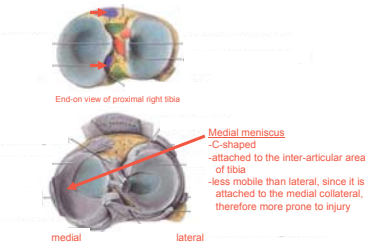
Menisci



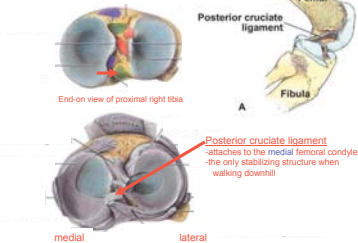
Menisci



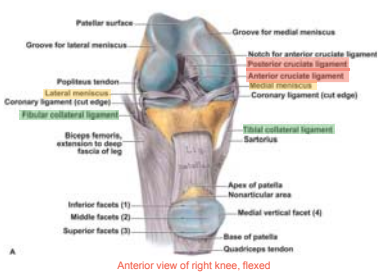
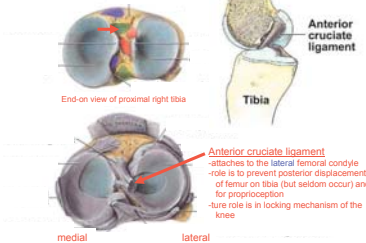
Menisci



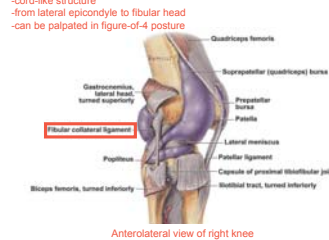
Cruciate ligaments



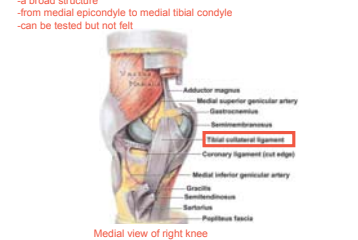
Cruciate ligaments



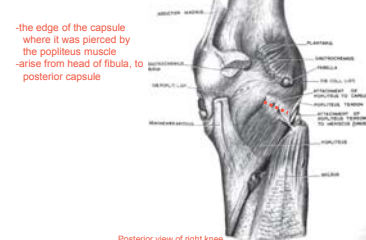
Lateral collateral ligament



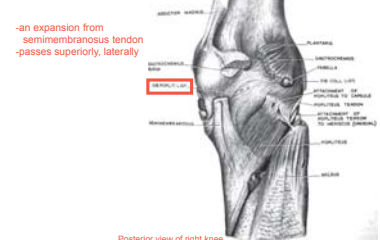
Medial collateral ligament



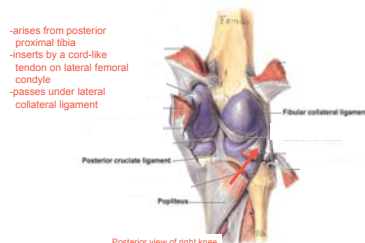
Arcuate popliteal ligament



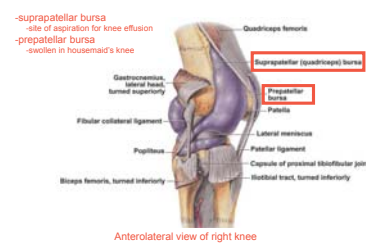
Oblique popliteal ligament



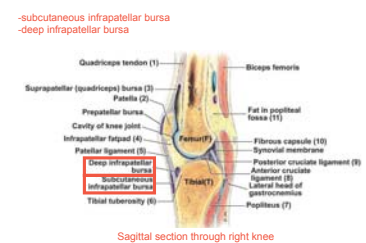
Popliteus tendon



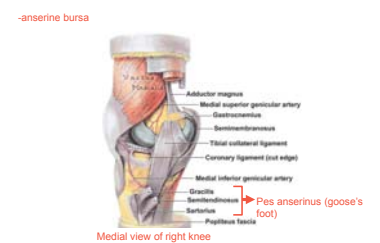
Bursae around the knee



Bursae around the knee



Bursae around the knee



颈腰椎源性疼痛的超声介入治疗

澳門科大醫院
疼痛科 張政

目录

1. 超聲概述
2. 頸、腰痛的解剖
3. 頸、腰注射治疗的适应症
4. 超聲引导下、腰腿的射擊特點
5. 超聲引导下、腰腿注射治疗的過程

01 超聲的概述

超聲概述

- 微创介入治療痛風神經根性疼痛
- 超聲引導技術促進了微创介入治療的發展
- 臨床上常用的體腔透視
 - > X光透視
 - > CT透視
- 超聲引導技術的優點
 - > 無放射線暴露
 - > 可重複操作
 - > 安全無痛
 - > 即時成像
 - > 可重複操作
 - > 超聲引導技術的缺點
 - > 超聲引導技術的缺點
 - > 超聲引導技術的缺點
 - > 超聲引導技術的缺點

超聲引導技術的優點

- 超聲引導技術的優點
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超聲概述-發展背景

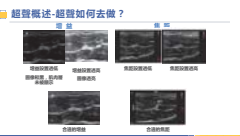
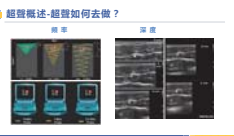
超聲引導技術的發展背景

超聲引導技術的發展背景

超聲概述-超聲如何做？

如何最大程度的發揮超聲的能力？

- > 探頭頻率
- > 深度
- > 增益
- > 聚焦



超聲概述-超聲引導穿刺7個技巧

1. 穿刺目標
2. 穿刺目標

超聲概述-超聲引導穿刺7個技巧

3. 穿刺目標

超聲概述-超聲引導穿刺7個技巧

4. 穿刺目標

超聲概述-超聲引導穿刺7個技巧

5. 穿刺目標

超聲概述-超聲引導穿刺7個技巧

6. 穿刺目標

超聲概述-超聲引導穿刺7個技巧

7. 穿刺目標

02 頸、腰椎的解剖

頸椎的解剖

頸椎的解剖結構

- 頸椎共有7個
- 頸椎7節，C1-7
- 頸椎7節，C1-7
- 頸椎7節，C1-7
- 頸椎7節，C1-7

腰椎的解剖結構

腰椎的解剖結構

- 腰椎共有5個
- 腰椎5節，L1-5
- 腰椎5節，L1-5
- 腰椎5節，L1-5
- 腰椎5節，L1-5

頸椎小關節及神經根解剖

頸椎小關節及神經根解剖

- 頸椎小關節及神經根解剖
- 頸椎小關節及神經根解剖
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- 頸椎小關節及神經根解剖
- 頸椎小關節及神經根解剖
- 頸椎小關節及神經根解剖

神經根內側支 (Medial Branch)

神經根內側支 (Medial Branch)

- 神經根內側支
- 神經根內側支
- 神經根內側支

腰椎及神經根的解剖

腰椎及神經根的解剖

- 腰椎及神經根的解剖
- 腰椎及神經根的解剖
- 腰椎及神經根的解剖

關節突關節 (Facet Joint)

關節突關節 (Facet Joint)

- 關節突關節
- 關節突關節
- 關節突關節

腰椎與神經根的解剖關係

腰椎與神經根的解剖關係

- 腰椎與神經根的解剖關係
- 腰椎與神經根的解剖關係
- 腰椎與神經根的解剖關係

椎間盤退變、突出

椎間盤退變、突出

- 椎間盤退變、突出
- 椎間盤退變、突出
- 椎間盤退變、突出

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- 椎間盤退變、突出
- 椎間盤退變、突出
- 椎間盤退變、突出

椎間孔狹窄

椎間孔狹窄

- 椎間孔狹窄
- 椎間孔狹窄
- 椎間孔狹窄

椎間孔狹窄

椎間孔狹窄

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- 椎間孔狹窄

神經根受刺激

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診斷和評估的重要性！！

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03 頸、腰注射治疗的适应征

General Application of Diagnostic Ultrasound in shoulder

University Hospital of Macau
Sio Mai Wo

Anatomy-muscles



Supraspinatus 岡上肌
Origin
Supraspinous fossa
Insertion
Greater tuberosity of the humerus

Anatomy-muscles



Infraspinatus 岡下肌
Origin
Posterior surface of the scapula (below the spine of the scapula)
Insertion
Greater tuberosity on the humerus

Anatomy-muscles



Subscapularis 肩胛下肌
Origin
Anterior (costal) surface of the scapula
Insertion
Lesser tuberosity of the humerus

Anatomy-muscles



Biceps brachii 肱二頭肌
Origin
Long head - top of the glenoid fossa
Short head - coracoid process
Insertion
Bicipital tuberosity of the radius

Anatomy-muscles



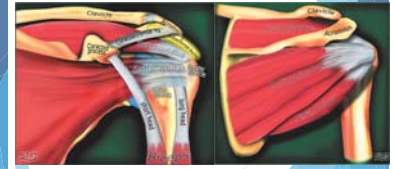
Teres Major 大圓肌
Origin
lower 1/3 of the lateral border of the scapula
Insertion
Intertubercular groove (between the greater and lesser tubercles) of the humerus

Anatomy-muscles



Teres Minor 小圓肌
Origin
Posterior surface of the scapula (below the spine of the scapula)
Insertion
Greater tuberosity on the humerus

SCANNING TECHNIQUE



Four muscles which make up the rotator cuff (肩袖)

Muscle	Origin on scapula	Attachment on humerus	Function
Supraspinatus muscle	supraspinous fossa	superior and middle facet of the greater tubercle	abducts the humerus
Infraspinatus muscle	infraspinous fossa	posterior facet of the greater tubercle	externally rotates the humerus
Teres minor muscle	middle half of lateral border	inferior facet of the greater tubercle	externally rotates the humerus
Subscapularis muscle	subscapular fossa	lesser tubercle (80%) or humeral neck (40%)	internally rotates the humerus

SCANNING TECHNIQUE

- Long head biceps tendon 肱二頭肌長頭
- Supraspinatus tendon 肩峰下肌肌腱
- Coraco-acromial ligament 喙肩韧带
- Acromio-clavicular joint (A-C joint) 肩鎖關節
- Subscapularis tendon 肩胛下肌肌腱
- Infraspinatus tendon 岡下肌肌腱
- Teres Minor 小圓肌

SCANNING TECHNIQUE

Long head biceps tendon 肱二頭肌長頭



SCANNING TECHNIQUE

Subscapularis tendon 肩胛下肌肌腱



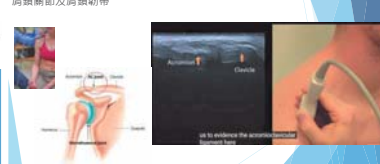
SCANNING TECHNIQUE

Coraco-acromial ligament 喙肩韧带



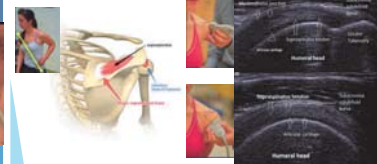
SCANNING TECHNIQUE

Acromio-clavicular joint & Acromioclavicular ligament 肩鎖關節及肩鎖韧带



SCANNING TECHNIQUE

Supraspinatus tendon 岡上肌肌腱



SCANNING TECHNIQUE

Infraspinatus tendon 岡下肌肌腱



SCANNING TECHNIQUE

Teres Minor 小圓肌



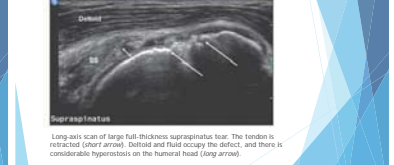
Rotator Cuff Tears



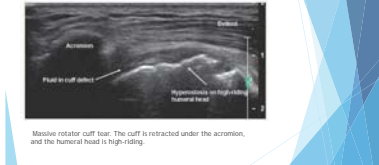
Rotator Cuff Tears



Rotator Cuff Tears



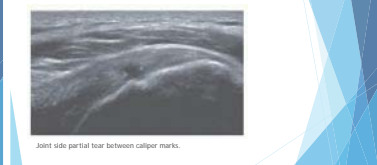
Rotator Cuff Tears



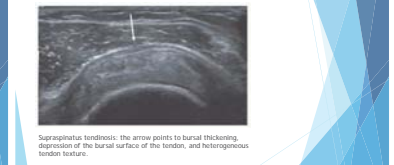
Rotator Cuff Tears



Rotator Cuff Tears



Rotator Cuff



Musculoskeletal Ultrasound : Knee

Dr. Chau Chi Hong
09/08/2020

職造醫務中心
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美國醫學超聲波認證委員會(肌肉骨骼醫學)註冊
香港肌骨醫學研究中心院士

The American Association of Orthopaedic Medicine (AAOM)

The American Association of Orthopaedic Medicine (AAOM) is a not-for-profit organization, which provides information and educational programs on the accurate diagnosis and comprehensive nonsurgical treatment of **musculoskeletal problems**. The AAOM promotes Orthopaedic Medicine by teaching doctors integrative diagnosis techniques and comprehensive/integrative nonsurgical treatment methods including prolotherapy injections (prolotherapy), steroid injections, fluoroscopic spinal interventions, osteopathic manual medicine, therapeutic exercise and interventions with various pharmaceutical/nutritional/herbal/homeopathic based treatments. The AAOM method of diagnosis/treatment is effective in providing relief to acute and chronic pain emanating from the Cervical Spine (neck), Thoracic Spine (midback), Lumbar Spine/ Sacroiliac Region (low back), Upper Limb (shoulder-elbow, wrist-hand), and the Lower Limb (hip-knee-ankle/foot).

MANUAL THERAPY

Manipulation

- Useful for loose bodies trapped inside the knee joint



The operator's left forearm contacts the patient's right buttock and introduces anterior and cephalad rotation to the pelvis, engaging the barrier at the L4 to L5 level. The operator introduces mobilizing thrust through the left forearm by a body drop in an anterior and cephalad direction.

FOOT ORTHOTIC THERAPY

扁平足



Overpronation of Feet

These problems include:

- Lateral patella dislocation or subluxation
- Patellofemoral pain syndrome
- Iliotibial band syndrome
- Quadriceps and patellar tendinopathy
- Medial and patellofemoral compartmental osteoarthritis



A pair of orthotics was prescribed to patient to aggressively correct the overpronation as well as provide stable support for the collapsing foot arch.

TAPING

Taping

- The application of adhesive tape around a joint to provide a semi-rigid and sometimes rigid splint
- Utilized in areas of
 - Injury care
 - Injury protection



Taping: Injury Care

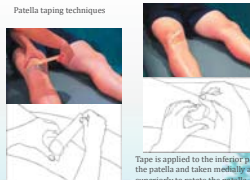
- Stabilization of compression bandages utilized to control internal and external bleeding
- Support for recent injuries in an effort to prevent additional trauma
- Provide stabilization during rehabilitation

Taping: Injury Protection

- Used to prevent acute injuries
- Limits motion
- Secures special device
 - Brace
 - Splint
 - Soft Cast
 - Padding



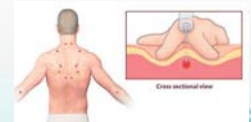
Patella taping techniques



Tape is applied to the inferior pole of the patella and taken medially and superiorly to rotate the patella.

INJECTION THERAPY

Trigger Point Injection



Ultrasound Equipment 超聲波



Appropriate transducer 探頭



Linear transducers are more effective for visualizing superficial structures such as nerves and tendons at higher frequencies. Curvilinear transducers are better with deeper structures visualized with lower frequencies.



Anatomy: Knee Joint



Musculoskeletal Ultrasound : Knee

Sonographic Technique: Knee

- Focused examination
- Complete assessment
 - Anterior
 - Medial
 - Lateral
 - Posterior
- Transducers: 5 - 17 MHz linear

Musculoskeletal Ultrasound : Knee

Technique: anterior

- Quadriceps tendon
- Patellar tendon
- Suprapatellar recess: joint effusion
- Bursa: Prepatellar, superficial infrapatellar, deep infrapatellar

Regenerative Injection Therapy & PRP Injections

Chan, Wai Sin
 President of The Macau Orthopaedic Association
 Chief Orthopaedic Surgeon of CHCSJ, Health Bureau

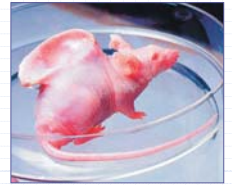
甚麼是再生醫學?



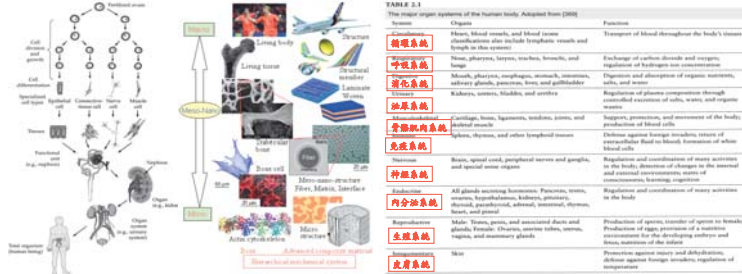
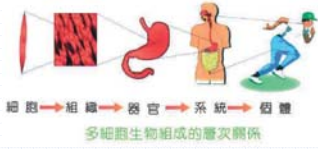
再生醫學

是指利用生物學及工程學的理論方法，促進機體組織和器官的自我修復與再生，或通過構建新的組織預備器官，來修復、再生和替代業已受損的組織和器官的醫學技術。這一技術領域涵蓋了幹細胞技術、組織工程和基因工程等現代生物工程技術，力圖從各個層次尋求組織和器官再生修復和功能重建的可能性。

甚麼是組織工程?



構成個體的層次



Why is it Important?

Birth Defects (genetic mutations)



Why is it Important?

Burn Victims



Why is it Important?

War Injuries



Why is it Important?

Sports Injuries

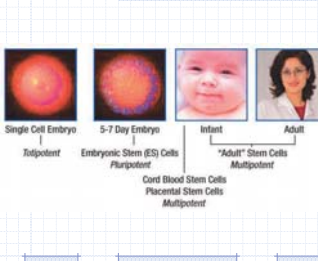
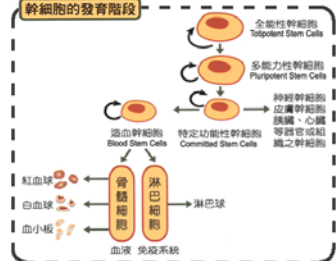


幹細胞(Stem Cell)

A cell that has the ability to continuously divide and differentiate (develop) into various other kind(s) of cells/tissues

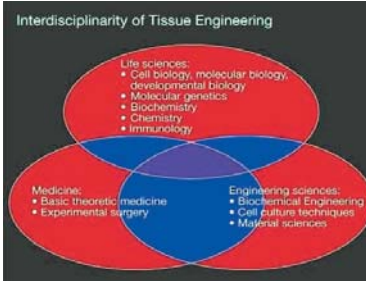
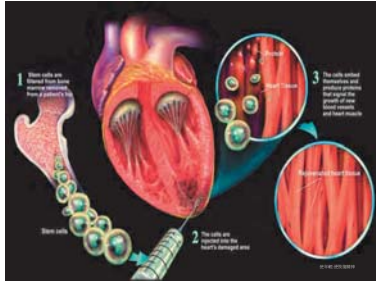
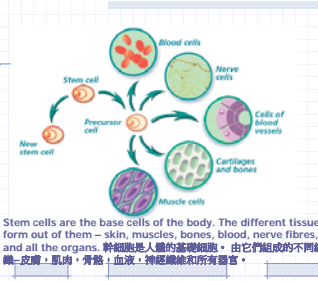


具有連續分裂和分化(發育)成各種其他類型的細胞/組織的能力的細胞

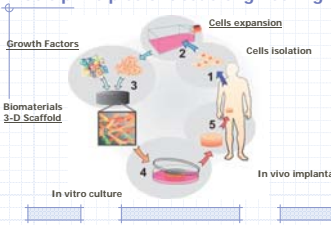


幹細胞從哪來?			
	乳牙幹細胞	臍帶血	骨髓幹細胞
來源	牙齦、牙齦齦帶、牙髓、牙髓尖組織	胎兒臍帶血	骨髓中骨髓
取得	乳牙脫落24小時內，以門牙、犬齒為主，取得容易	出生時保存，儲備，難度不高	骨髓穿刺，難度最高
次數	多次機會	一生一次	具侵入性，次數有限
費用	未定，依市價評估，超過10萬元	3.5至9.9萬	公益儲存，不收費

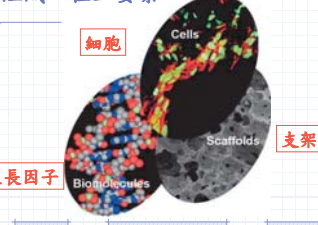
資料來源：中興大學幹細胞及組織工程中心主任廖慶豐 教授/劉敬定



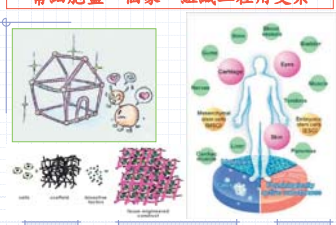
組織工程基本原理



組織工程三要素



幫細胞蓋一個家...組織工程用支架



Scaffolds 支架

- Various textures and materials
- Encourage cells to grow
- Allow nutrients to permeate
- Won't harm the patient

Tissue Engineering

- Generation of semi-synthetic tissues and organs
 - Biocompatible scaffolding materials
 - Synthetic polymer or natural material (e.g. collagen)
 - Living cells grown in culture
 - Fully differentiated cells
- From simple tissues and organs (skin, cartilage, urinary bladders) to whole organs using stem cells