

主 題：再訪膝關節超音波
Ultrasound for Knee: Revisited

內容簡述：膝關節問題是臨床上常見的問題，包括由年輕人的運動傷害到老年的退化，骨骼肌肉超音波提供臨床醫師快速診斷與設定治療策略的能力，此外，超音波也是最方便且即時的導引注射工具。然而，膝關節複雜的骨結構限制了超音波的穿透力，也限制了觀察關節內部結構與診斷的能力。今年的「再訪膝關節超音波」系列演講，將再次複習並探討膝關節超音波的優點、限制與新進展，讓臨床醫師在這熟悉但重要的膝關節超音波檢查上，能有更多的新觀念並刺激新想法。

Moderator: 姜義彬 Yi-Pin Chiang 馬偕醫院
吳爵宏 Chueh-Hung Wu 新竹臺大分院

時間 Time	題目 Topic	演講者 Speaker
13:45-13:50	Opening Remarks	姜義彬 Yi-Pin Chiang 馬偕醫院
13:50-14:20 MSK-S01	Pediatric Knee Ultrasound: Unlocking Insights into Young Joints	楊舒媚 Shu-Mei Yang 臺大醫院復健部
14:20-14:50 MSK-S02	Knee Ligament Ultrasound: Exploring Precision Imaging	魏國展 Kuo-Chang Wei 臺大醫院復健部
14:50-15:20 MSK-S03	Knee Pain Ultrasound: Unveiling Hidden Lesions	邱熙亭 His-Ting Chiu 聯新國際醫院 運動醫學科
15:20-15:40	Coffee Break	
15:40-16:10 MSK-S04	Post-Operative Knee Ultrasound: Navigating Recovery Through Imaging	莊泓叡 Hung-Jui Chuang 臺大醫院復健部
16:10-16:40 MSK-S05	Ultrasound-Guided Diagnostic Blocks in Knee Pain: Bridging Diagnosis and Treatment	蘇炯睿醫師 Daniel Chiung-Jui Su 奇美醫院 復健部
16:40-16:45	Closing Remarks	吳爵宏 Chueh-Hung Wu 新竹臺大分院

ePoster

MSK-P01	Application of Handheld Ultrasound for Real-Time Evaluation of Patellar Tendon Changes After Exercise in Adolescents	楊景堯 Ching-Yao Yang 誠陽復健診所
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MSK-S01

Pediatric Knee Ultrasound: Unlocking Insights into Young Joints

Shu-Mei Yang

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Ultrasound is a well-established imaging tool for adult musculoskeletal evaluation, but its use in pediatric patients remains limited. Age-related variations in knee sonoanatomy due to bone maturation and ossification hinder the creation of reliable reference standards, and standardized definitions of gray-scale and power Doppler findings across pediatric age groups are lacking. Nevertheless, ultrasound offers key advantages in children: it is accessible, well tolerated, free of ionizing radiation, and enables dynamic, real-time assessment without sedation. The pediatric knee, a common site of musculoskeletal disorders, has distinct anatomical and developmental features compared to adults, making accurate assessment essential for conditions such as juvenile idiopathic arthritis, sports injuries, and congenital anomalies. In this lecture, we will present a standardized scanning protocol for the pediatric knee, including patient positioning, probe selection, and systematic evaluation of cartilage, growth plates, synovium, ligaments, and tendons, illustrated with representative images across developmental stages.

MSK-S02

Knee Ligament Ultrasound: Exploring Precision Imaging

Kuo-Chang, Wei

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Ultrasound has become an increasingly valuable tool in the assessment of knee ligament integrity, offering dynamic, real-time evaluation at the point of care. This session will provide a practical overview of sonographic anatomy and

scanning techniques for major knee ligaments. Clinical applications, image optimization tips, and common pathological findings will be discussed to enhance diagnostic accuracy and support clinical decision-making.

MSK-S03

Knee Pain Ultrasound: Unveiling Hidden Lesions

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Research has linked fascial dysfunction to common knee conditions such as patellofemoral pain syndrome, iliotibial band syndrome, and osteoarthritis. Pathological findings include fascial thickening, adhesions, and impaired mobility, contributing to chronic pain and altered biomechanics. Postoperative fibrosis and entrapment neuropathies may also involve fascial structures. Emerging techniques such as ultrasound elastography and guided hydrodissection offer new diagnostic and therapeutic possibilities. Integrating fascial assessment into knee and adjacent body parts ultrasound examination enhances diagnostic accuracy and informs targeted interventions in sports medicine and rehabilitation.

MSK-S04

Post-Operative Knee Ultrasound: Navigating Recovery through Imaging

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Total knee replacement (TKR) is a highly effective procedure for end-stage osteoarthritis, yet a significant subset of patients experiences persistent post-operative pain, posing a con-

siderable diagnostic and therapeutic challenge. This presentation aims to provide a comprehensive overview of the multifaceted etiologies of pain following TKR and to highlight the pivotal role of musculoskeletal ultrasound in the differential diagnosis.

MSK-S05

Ultrasound-Guided Diagnostic Blocks in Knee Pain: Bridging Diagnosis and Treatment

Daniel Chiung Jui Su

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Accurate diagnosis of knee pain can be challenging due to the complexity of joint structures and the frequent overlap in clinical presentations of intra-articular and periarticular pathologies. While ultrasound scanning or other modalities such as MRI play a crucial role in identifying structural abnormalities, it does not always directly correlate with patient symptoms. To bridge this diagnostic gap, ultrasound-guided diagnostic blocks offer an approach that enhances clinical decision-making.

This presentation examines the application of targeted, ultrasound-guided diagnostic injections to aid in differentiating overlapping or coexisting knee pathologies. Once a suspected pain generator is identified, a local anesthetic or a simple dry needle is introduced under ultrasound guidance to confirm or exclude the structure as a primary pain source.

By correlating symptom relief with specific anatomical targets, this approach allows clinicians to move beyond treating static imaging findings and instead focus on functionally relevant pain generators. The method enhances diagnostic precision, guides future therapeutic strategies, and improves patient outcomes.

Ultrasound guidance ensures high accuracy and safety during the injection procedure, minimizing risk to surrounding neurovascular structures. Through case examples and procedural

video, this talk will highlight the clinical reasoning, scanning techniques, and needle approaches essential for effective diagnostic blocks in the knee.

Ultimately, integrating ultrasound-guided diagnostic blocks into routine clinical practice shifts the paradigm from image-based treatment to individualized, symptom-guided care, ensuring we truly treat the patient, not just the picture.

MSK-P01

Application of Handheld Ultrasound for Real-Time Evaluation of Patellar Tendon Changes after Exercise in Adolescents

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Background:

Adolescents are at increased risk for patellar tendon overuse injuries due to rapid growth and biomechanical imbalances. While chronic adaptations of tendon structure have been documented, the acute response of the adolescent patellar tendon to exercise is less understood. Portable ultrasound now enables real-time, field-based evaluation of these changes.

Objective:

To examine whether a 30-minute running session induces acute changes in patellar tendon thickness in healthy adolescent males, and to assess the reliability of a standardized handheld ultrasound protocol.

Methods:

Thirty healthy males (aged 15–17 years) participated in a pre-post observational study. A 10–12 MHz handheld ultrasound was used to measure patellar tendon thickness at three sites (proximal, mid-substance, distal) before and within 5 minutes after a treadmill run. Two trained sonographers assessed reliability using intraclass correlation coefficients (ICC). Repeated-measures ANOVA and Bonferroni-corrected t-tests were used for statistical analysis.

Results:

Ultrasound measurements demonstrated

excellent reliability (intra-rater ICC > 0.94; inter-rater ICC > 0.89). A significant reduction in thickness was observed at the proximal tendon (−0.35 mm, ~7%; $p < 0.001$), exceeding the minimal detectable change. No significant changes occurred at the mid-substance or distal locations.

Conclusion:

A single bout of running caused a localized, transient decrease in proximal patellar tendon thickness in healthy adolescent males. This finding

supports the use of handheld ultrasound to detect acute tendon responses and provides insight into region-specific tendon loading. The results may help inform injury prevention strategies and serve as a baseline for identifying abnormal tendon responses in youth athletes.

Key words:

Patellar tendon, Adolescent, Portable ultrasound, Tendon thickness, Sports medicine