MSK-S01

Torticollis in Children. Imaging of Ultrasound, and Rehabilitation

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Wry neck is one of the common symptoms during infancy, presenting with unilateral head tilting, neck rotation limitation, and sometimes accompanied with a palpable neck mass. Parents are usually worried while being notified about the diagnosis, treatment and prognosis. Muscular origin torticollis is one of the etiologies of wry neck during infancy. To differentiate the etiologies of wry neck in children, comprehensive history taking, physical examination and imaging studies are necessary. Among the image modalities, ultrasound examination of neck is a good tool because its accessibility, no radiation exposure, and quickly for diagnosis and future follow-up.

This speech would focus on (1) introduction of normal neck structures by ultrasound in children, (2) diagnosis of muscular torticollis by ultrasound in children, (3) diagnosis of neck mass by ultrasound in children, and (4) differential diagnosis and rehabilitation program set-up of torticollis based on ultrasound in children.

MSK-S02

Torticollis in Children. Imaging of Radiography, CT Scan, and Current Orthopaedic Surgery.

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Torticollis, also known as “wry neck”, is a clinical finding of head tilt with or without rotational spinal malalignment. Torticollis can be acute or chronic (>1 week), and may be congenital or acquired. There is a wide range of causes of torticollis and the presence of associated symptoms/signs is important in narrowing the possible causes. Congenital torticollis, seen in infants, usually results from muscular causes (CMT) or craniocervical vertebral anomalies, although ocular abnormalities such as congenital strabismus should also be considered. Acquired torticollis, seen in older children, is often secondary to trauma, infection, or tumors.

Imaging should be used as a diagnostic tool after a complete medical history and clinical examinations have been obtained. In infant type of congenital torticollis, ultrasonography is the modality of choice. In cases of acquired torticollis such as trauma, conventional radiography should be the first-line imaging modality. In nontraumatic acquired torticollis, computed tomography (CT) of the cervical spine is the main imaging study if vertebral bony malalignment was suspected. If CT findings are negative, magnetic resonance (MR) imaging of the brain and cervical spine should be further performed. The use of multiple imaging modalities (conventional radiography, US, CT, and MRI) is common in the radiologic work-up of atypical or neglected torticollis, and clinicians must understand the role of each imaging modality in patients of various ages and etiologies.

When diagnosed early, it is accepted that muscular torticollis (MT) can be managed with good results using physiotherapy. However, regarding neglected cases of MT in older children, surgical approaches include unipolar or bipolar sternocleidomastoid release with or without Z-plasty can be practiced. For torticollis of skeletal origin, the primary goals of surgery for upper cervical spine deformity are reduction of the malalignment; decompression of the cervical spinal cord, and stabilization of the upper cervical spine.

MSK-S03

Non-Invasive Assessment Tools for Pediatric Head and Neck Lesions - Ultrasound and 3D Printing

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Superficial palpable masses of the head and neck are common in the pediatric population, with the vast majority of the lesions ultimately proven to be benign. Duplex ultrasonography (US) has emerged as the first-line imaging modality for the evaluation of superficial pediatric masses. Without utilizing radiation, iodinated contrast material, or sedation and/or anesthesia, US provides a means for quick and cost-effective acquisition of information, including the location, size, shape, internal content, and vascularity of the mass. In this review, the US findings are described for a variety of common and uncommon pediatric head and neck masses diagnosed in our practice. Our 10 years experiences in pediatric ultrasound about 1500 cases, US findings is very important in determining the most accurate preoperative diagnosis without exposing the children to unnecessary utilizing ionizing radiation or anesthesia. Three-dimensional (3D) imaging has been available for decades, it has helped to better perceive complex anatomic and pathologic relations. Novel 3D printing technologies can transfer virtual anatomic models into true 3D space and produce both patient-specific models and medical devices. Most of the applications are found in cardiovascular, head and neck, temporal bone model, tracheal stenosis. 3D printed model may provide a realistic model to help participants gain experience with anatomic limitations.

MSK-P01

Hyaluronic Acid Injection for Osteroarthritic Knee did not Change Ultrasound-detected Synovitis but Similarly Improved Clinical Ooutcomes

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Objectives: The synovitis in osteoarthritis (OA) knee was an inflammatory process and suggested to significantly correlated with knee pain. The study was to determine if HA can mitigate the imaging detect synovitis in OA

Methods: Patients with symptomatic OA knee and ultrasound-evident-synovits were included. These patients receive US guided fluid drainage with subsequent Hyaluronic acid (HA) injection with 2 times at 2-week intervals; before injection at baseline, 1th month after treatment complete and 6th months. Imaging evaluation was based on complete knee ultrasound exam included Power Doppler Ultrasound (PDUS), Depth of SF over suprapatella bursa (SF), and the height of synovial hypertrophy (SH) was measured simultaneously. Other US feature such as meniscus lesion, cartilage erosion was also conducted. Initial Clinical assessments were also performed using a visual analog scale (VAS) and The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC index).

Results: A total of one hundred and three patients satisfied the inclusion criteria completed the trial were included in the analysis. Patient demonstrated improvement in VAS at 1 month and 6 month evaluation ($P<0.001$). WOMAC also significantly decreased at 1month evaluation ($P<0.001$) but not at 6 month evaluation ($P=0.23$). There are no change in ultrasound parameter. SF didn't change from baseline to 1th month evaluation ($P=0.49$) and 6th month ($P=0.118$). Synovial vascularity of PDUS revealed decreased tendency at 6 month evaluation but didn't reach significant level ($p=0.059$) There are no change of SH at one month ($P=0.918$) and at 6 month ($P=0.446$) Subgroup analysis also revealed no imaging change in early OA or late OA.

There are no significant association between change of WOMAC or VAS and change of SF, SH or PDUS. The significant association was observed in baseline evaluation over VAS and SF ($R=0.416$, $P=0.001$), VAS and SH ($R=0.394$, $P=0.003$), WOMAC and SF ($R=0.346$, $P=0.036$).

Conclusion: HA injection improved pain and knee function. The imaging detected synovitis in

knee OA didn't change similarly but correlated with baseline clinical symptom.

MSK-P02

Biophysical Effect of Extracorporeal Shock Wave on Ultra-hypertrophied Tendinopathy of Achilles Tendon

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A 30-year-old young adult male was showing up with a stiff ankle, recovering from surgical repair one and a half months ago for complete tear of his achilles tendon in a sport injury. At the time of first visit, physical examination showed that ankle motion was from 20 degrees plantar flexion to -5 degrees ankle dorsiflexion, slightly decreased muscle strength, and stiffness without much pain. He started to have six weeks of continuous rehabilitation therapy including modality therapy, stretching, tendon massage, and strengthening exercise. Second evaluation, there was limited progress regarding ankle motion from 30 degrees plantar flexion to neutral ankle dorsiflexion, still with stiff sensation. By ultrasonography, the healed tendon appeared ultra-thickening in diameter and complete loss of fibrillar echo-texture, instead replaced by blurred and hypoechoic echo-texture. Extracorporeal shock wave (ESW) was hence recommended for 8 sessions on top of conventional physical therapy. The patient reported a feel of softer and loosening over his achilles tendon after the ESW therapy, along with objective improvement in the ankle motion from 45 degrees plantar flexion to 30 degrees dorsiflexion and much improved functionality. In the last check-up, he was satisfied with the outcome that he can walk, run, jump, squat, and ascend/descent stairs painlessly and efficiently, just slightly inferior in overall functionality compared with contralateral ankle.

Literature review: Despite prosperous development in bioengineering concerning fast tendon recovery, evidence in applied therapeutics is still few due to complexity and cost. Current literature reminded us the benefits of conventional physical modalities including pulsed ultrasound, pulsed electromagnetic field, and extracorporeal shock-wave in tendon recovery at molecular and cellular level, it seemed more pragmatic to optimize current protocol of physical modalities in combination with tissue engineering to achieve better outcomes for an injured tendon in the future.

Keywords: Achilles tendon, extracorporeal shock wave (ESW), tendon fibrosis, tendon hypertrophy, ultrasonography.