

Ultrasound evaluation of the mandibular condyle cartilage thickness and its influence on the temporomandibular joint and masseter muscle

Poster No.: C-2384
Congress: ECR 2018
Type: Scientific Exhibit
Authors: R. A. M. Santos¹, C. S. S. D. Silva², S. F. C. Noite¹, A. André¹;
¹Coimbra/PT, ²044/PT
Keywords: Radiographers, Musculoskeletal joint, Musculoskeletal soft tissue, Ultrasound, Experimental investigations, Efficacy studies, Tissue characterisation
DOI: 10.1594/ecr2018/C-2384

Any information contained in this pdf file is automatically generated from digital material submitted to EPOS by third parties in the form of scientific presentations. References to any names, marks, products, or services of third parties or hypertext links to third-party sites or information are provided solely as a convenience to you and do not in any way constitute or imply ECR's endorsement, sponsorship or recommendation of the third party, information, product or service. ECR is not responsible for the content of these pages and does not make any representations regarding the content or accuracy of material in this file.

As per copyright regulations, any unauthorised use of the material or parts thereof as well as commercial reproduction or multiple distribution by any traditional or electronically based reproduction/publication method is strictly prohibited.

You agree to defend, indemnify, and hold ECR harmless from and against any and all claims, damages, costs, and expenses, including attorneys' fees, arising from or related to your use of these pages.

Please note: Links to movies, ppt slideshows and any other multimedia files are not available in the pdf version of presentations.

www.myESR.org

Aims and objectives

The temporomandibular joint (TMJ) is one of the most commonly used joints in the human body (1). It is composed by two types of cartilage, fibrous and hyaline, which allows the condylar cartilage to adapt better to forces when compared to the primary cartilage (1,2). Ultrasound in the study of TMJ has the great advantage of evaluating the articulation in its greater extent in a non-invasive or uncomfortable way for the patient, since it uses the properties of reflection of the ultrasound in the differences of densities present in the organism (3).

To evaluate the ultrasound reproducibility in mandibular condyle cartilage thickness and masseter muscles thickness and echo-intensity. To characterize the cartilage of the mandibular condyle and the masseter muscle. To analyse the correlation of the ultrasound measurements and the anatomical side, patient position and headache.

Methods and materials

A General Electric's Logiq e ultrasound equipment equipped with a 7-12 MHz linear transducer array was used to evaluate the masseter muscle and articular condyle and its cartilage. The participants were in supine position. After recognizing the temporomandibular articulation, the articular condyle and its cartilage were evaluated. Three images with mouth closed and three images with mouth open. For masseter muscle, three images were acquired in contraction and three images in rest. All protocol was performed bilaterally. Thus, 24 images were obtained per participant, and 720 images were obtained in the study. The images were analysed using ImageJ software (National Institutes of Health, Bethesda, MD, USA). Finally, a recurrent statistical analysis was performed on SPSS 23.0 software (Statistic Package Social Sciences Inc., Chicago, IL, USA).

Images for this section:

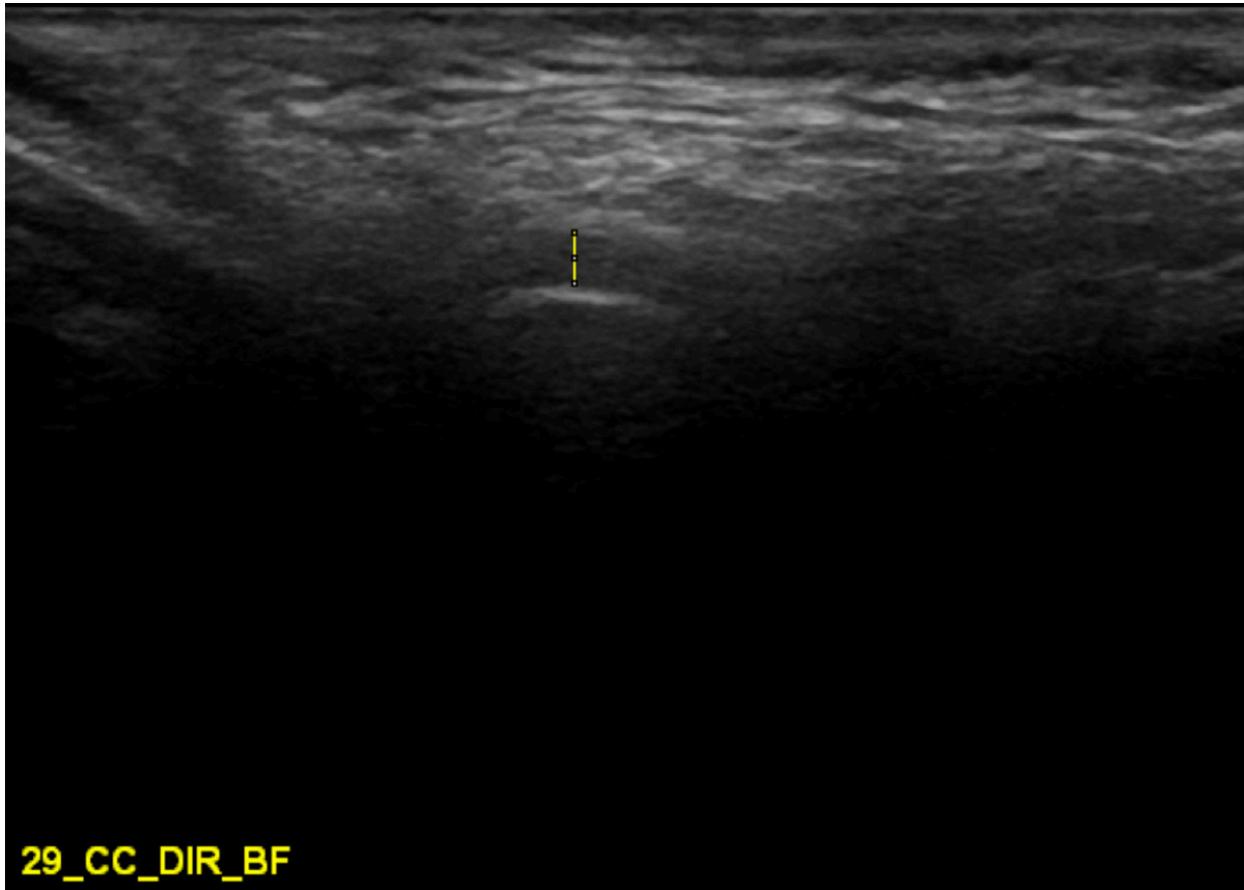


Fig. 1: Mandibular condyles thickness measurement (defined by the distance between the superficial and depth of each structure)

© Imagem Médica e Radioterapia, Instituto Politécnico de Coimbra, Escola Superior de Tecnologia da Saúde de Coimbra - Coimbra/PT

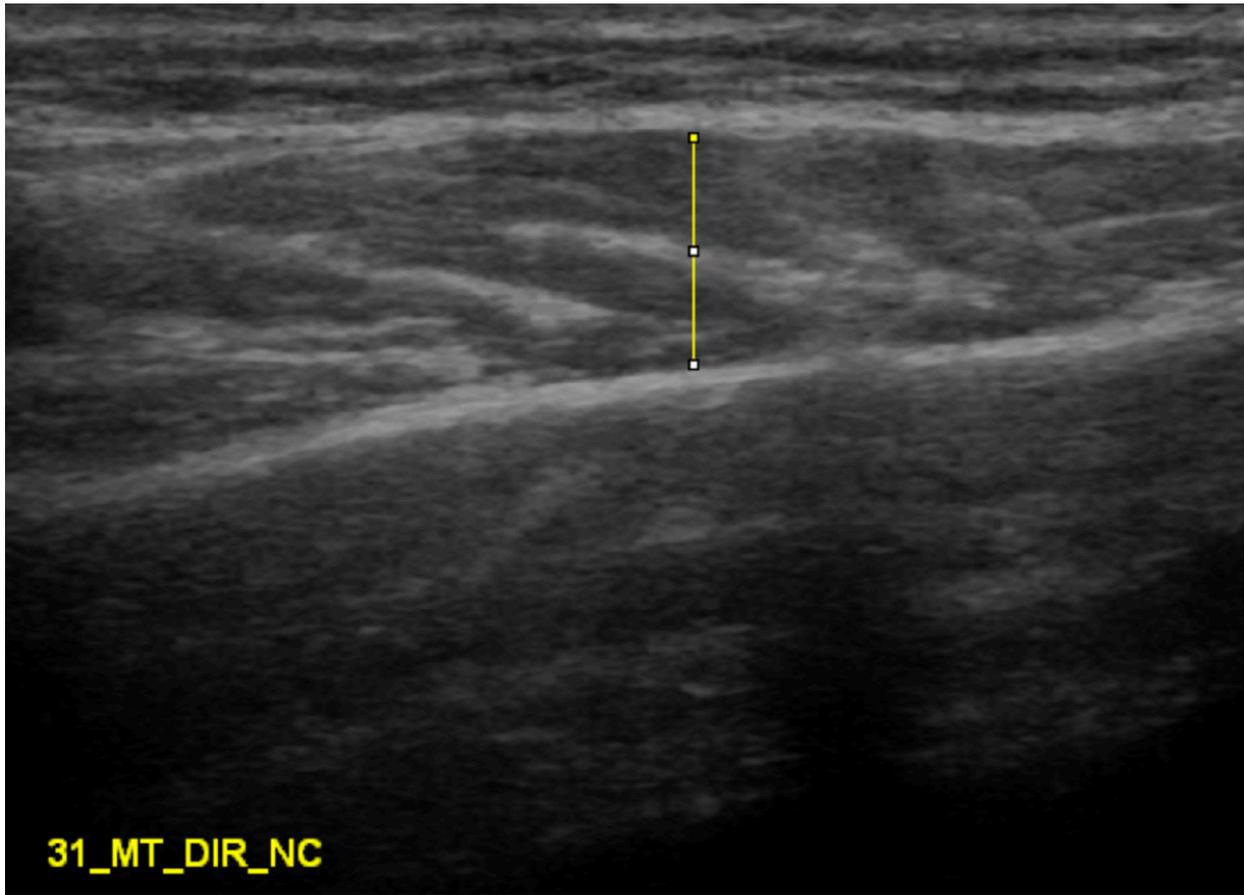


Fig. 2: Masseter muscle thickness measurement (defined by the distance between the superficial and deep limits of each structure)

© Imagem Médica e Radioterapia, Instituto Politécnico de Coimbra, Escola Superior de Tecnologia da Saúde de Coimbra - Coimbra/PT

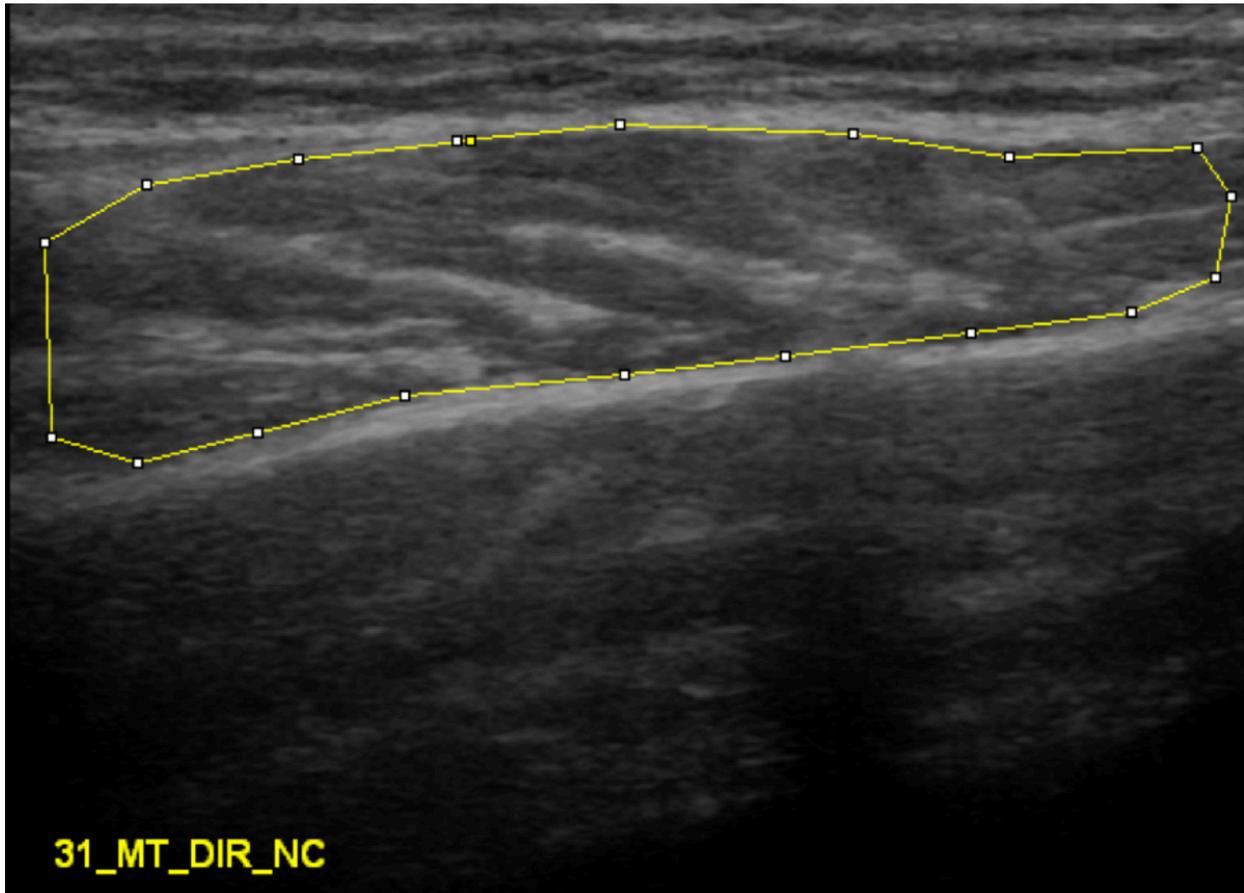


Fig. 3: Masseter muscle echogenicity measurement (defined by the selection of the area of maximum interest including all possible muscle without any bone or fascia)

© Imagem Médica e Radioterapia, Instituto Politécnico de Coimbra, Escola Superior de Tecnologia da Saúde de Coimbra - Coimbra/PT

Results

Except left condyle with Closed Mouth thickness, all measurements present an excellent reproducibility (ICC values between 0.784 and 0.980, in a scale of 0 to 1, being that it is considered excellent when ICC \geq 0.750). The ICC value obtained for Condyle Thickness Left Closed Mouth, 0.713, represents a satisfactory reproducibility.

Considering the analyzed side (right vs. left), there were only statistically significant differences ($p < 0.050$) in the values of muscle ecogenicity.

When comparing the values obtained by the same structure, but at different moments of evaluation (open mouth vs. mouth closed and rest vs. contraction), there were statistically significant differences for all variables, since $p < 0.050$.

The results obtained when related to the headache described by the participants and the acquired measurements (structures vs. headache), there were no significant differences in the thickness of the right condyle in the open mouth and in the closed mouth ($p > 0.050$).

Conclusion

Temporomandibular joint ultrasound, although there is not literature about, proved to be a very reproducible imaging method, since excellent ICC values (ICC # 0.750) were obtained for all measurements. The condyle head and the articular eminence were shown in the image as hypoechogenic structures and the bone margin and the capsule joint were visualized as hyperechogenic, as Mello, et al (2011) and Melis et al. (2007) showed in their studies (4,5). The articular disc presents with intermediate and homogeneous echogenicity, and it is in consonance with Mello, et al. (2011) (5).

Ultrasound is a high reproducible method to evaluate the mandibular condyle cartilage, affordable and cost-effective diagnostic imaging method and could help on diagnostic of temporomandibular joint.

Personal information

Rute Santos

rutesantos@estescoimbra.pt

References

1-Biasotto-gonzalez, D. A. et al. Correlação entre disfunção temporomandibular, postura e qualidade de vida. *Rev Bras Crescimento Desenvol Hum.* 2008; 18(1) 79-86. 18, 79-86 (2008)

2-Queensland, U. De & Biology, O. Cartilagem Condilar da Mandíbula#: uma Revisão. *Int. J.* 1, 85-94 (2004)

3-*Dental Press J. Orthod.* 15, 172-181 (2010); Mello, C. Sonographic evaluation of temporomandibular joint internal disorders. *Radiol. Bras.* 44, 355-359 (2011)

4-Mello, C. Sonographic evaluation of temporomandibular joint internal disorders. *Radiol. Bras.* 44, 355-359 (2011).

5-Melis, M., Secci, S. & Ceneviz, C. Use of ultrasonography for the diagnosis of temporomandibular joint disorders: A review. *Am. J. Dent.* 20, 73-78 (2007).