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Critical Analysis of the Krogh-Paulsen Index

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SUMMARY

Introduction: In 1934 James Costen, otolaryngologist, described a few symptoms related to the ear and the Temporomandibular Joint (TMJ), which he grouped in the term Costen syndrome, Bell suggested the term Temporomandibular Disorders (TMD). The American Dental Association adopted the term Temporomandibular Disorders (TMD).

Objectives: To identify the difficulties of the Krogh-Paulsen index to make the diagnosis of Temporomandibular Disorders.

Procedure: (20) articles and 2 books were used online, by the databases of Google scholar, Infomed, Scielo, Pubmed, Lilacs, Cumed.

Results: As this index was the pioneers in the diagnosis of TMDs, and at that time (1968) there was controversy regarding the articular position of the central relationship and for that reason the articular position was not clearly defined, so it was promptly displaced by other indices.

Conclusion: Although this Index is widely used in Europe, especially in Denmark, it does not cover the expectations to quantify the severity of TMTs.

Keywords: Temporomandibular Joint (TMJ); Temporomandibular Disorders (TT);Krogh-Paulsen

Introduction

James Costen, otolaryngologist, cited by Edward F. Wright, [1,2] described a few symptoms related to the ear and the Temporomandibular Joint (TMJ), which he grouped in the term Costen syndrome, Bell [3] suggested the term Temporomandibular Disorders (TMD). The American Dental Association adopted the term Temporomandibular Disorders (TMD). Since the TTM were defined in the time of Costen, it has been very difficult to identify and differentiate them, initially they were studied from a clinical point of view, when observing their multifactorial origin and that affected a large part of the population, it was given epidemiological importance. There are different indices with which TMDs can be diagnosed and that allow epidemiological studies to be carried out, the simplified Krogh-Paulsen indices allow us to study TTM clinically and epidemiologically. Krogh-Paulsen develops this evaluation

index in 1969 is the first to try to develop an evaluation method to diagnose (TMT), includes nine items that evaluates the function of the stomatognathic system and determine the diagnosis about the existence or not of dysfunction of the temporomandibular joint, (TMJ) the risk of suffering from it and if it presents disturbance in the TMJ [4]. Initially the Krogh-Paulsen bite test consisted of biting a flat, thin wedge, placing it unilaterally between the molars. Ipsilateral pain is considered of the muscular type and contralateral pain is considered a TMJ problem. Although it is widely used, no scientific evaluation of its actual clinical value has been published [5]. Considered one of the first to develop a measurement test with certain parameters and study through a brief clinical examination and anamnestic questions to detect the presence of TMD was Krogh-Paulsen in 1969 [6], establishing a format of nine items that were defined by a quantitative-qualitative evaluation, which identified certain ranges if the patient has dysfunction or not.

It is considered a healthy subject if it does not present any positive item, if one presents it considers it a disturbance, unless they are items 6 and / or 9, it is already considered that there is TTM, since these items are considered determinants, at that time (1968) there was controversy regarding the articular position of the central relationship and for that reason the articular position was not clearly defined [6], the Krogh-Paulsen test, [7] indicates in its item 7 (refers to contact in a central relation), as a positive point in dysfunctional aspects, at present it is considered positive if it exceeds the allowed values of normality. It explores in an orderly and sequential manner the different components of the TMJ, muscle groups, TMJ and dental occlusion, diagnostic dysfunction, risk and disturbance of the TMJ. Nowadays it is not widely used, because it is difficult to apply, and the exploration of some items shows low specificity and the index that is treated here lacks clinical elements for the correct diagnosis of Temporomandibular Disorders which leads the authors of this article to propose the following objective: Identify the difficulties of the Krogh-Paulsen index to make the diagnosis of Temporomandibular Disorders.

Materials and Methods

20 articles and 2 books were used and 5 articles that did not refer to the Krogh-Paulsen index were discarded, the Google Scholar platform, Infomed, Scielo, Pubmed, Lilacs, Cumed were used.

Interpretation

The nine indicators of the Krogh-Paulsen index are described as follows:

Restriction of the Oral Opening: measuring with a vernier the maximum oral opening, measuring between the upper and lower incisal edges, plus the vertical overbite if it is equal to or less than 40 millimeters.

Irregularity in the Opening and Closing Movement: it is observed if there is any zigzagging or deviation of the midline during these movements.

Muscle pain on palpation: palpation is performed in five muscle groups (internal and external pterygoids, masseter, temporal and posterior belly of the digastric) on the right and left side.

Temporal Muscle: it is performed with the mouth closed, placing the middle finger on the temple, the index finger at the top of the temporal fossa and the ring finger behind the pavilion of the ear.

External Pterygoid Muscle: Palpated by placing the middle finger at the outer pole of the jaw condyle and prompted to open the mouth during the examination.

Masseter Muscle: it is palpated with the mouth closed, placing the index finger and middle finger on the deep fascicle of the muscle and then sliding the fingers towards the angle of the jaw palpating the main fascicle.

Posterior Belly Muscle of the Digastric: palpated with the mouth closed and the patient's head is rotated on the opposite side of the examination and pressed with the edge of the menique finger into the groove of the mastoid process.

Internal Pterygoid Muscle: palpated with a closed mouth, and the head is rotated to the opposite side and down and then pressed with the middle and index finger against the inner face of the angle of the jaw. (Annex 1)

TMJ pain: The menique finger is inserted into the right and left ear canal by pressing forward and the patient is asked to open and close the mouth during the exam.

Clicking or Noise of the TMJ: it will be determined by simple hearing or the use of the stethoscope when opening and closing the mouth, in these indicators the opposite side must be taken into account as a control, giving great importance to the comparative element between one side and another.

Lock in Opening or Closing: it will be observed if there is a limitation in the opening and if it can be overcome with manual effort with click and mandibular deviation.

Instability between Central Relationship Position (CR) and Maximum Intercuspidation (MIC): the patient is asked to in postural position with the look in front, swallow saliva, moisten the lips with the tip of the tongue and leave the jaw loose (without dental contact), he is asked the sensation he experiences. There are four possible patient responses: if he feels simultaneous contacts on both sides (a) or no difference can be identified (b) is an indication of stability between CR and MIC. If you touch one side before the

other (c) or only in front (d) there is instability between these two positions.

Sagittal Slip Greater than 1 millimeter of MIC: the jaw is manipulated and it is determined if there is mandibular displacement greater than 1 millimeter in the final segment of the closing arc.

Lateral Displacement from CR to MIC: the same procedure as the previous indicator is performed, it is considered positive if the mandibular slip is in the final segment of closure has lateral behavior [2,8,9]. Risk factors are bruxism, stress, tooth loss, third molar exodontia, parafunctional habits, occlusal interference, unilateral chewing, anterior and posterior crossbite.

Discussion

Dr. Krogh-Paulsen was the pioneer in the area of mandibular function and dysfunction. His expertise in the clinical management of occlusal problems has had an impact on educators and clinicians around the world. The Krogh-Paulsen muscle exploration index is internationally recognized[10-12]. The nine items that allow to evaluate the function of the stomatognathic system and determine the diagnosis for TMJ dysfunction, the risk of suffering from it and if it presents disturbance. Dysfunction is considered if three items or items six and nine are positive. Risk when two items are present, and Disturbance only with the presence of one item. (Annex 2).

The Difficulties We Observe Are the Following

In the palpation of the external or lateral pterygoid muscle it is more practical and gives us greater certainty, if we palpate it intraoral, the lower bundle of the external pterygoid, with the little finger is located in front of the anterior pillar to the tuberosity area. At that moment it slides in finger backwards, with moderate pressure, until a slight pain [13-15], in the way that is done in the Krogh-Paulsen analysis, this author considers that it is insufficient or very little we can feel this muscle, if we perform it both extraoral and intraoral we will have more information in its palpation. In the palpation of the internal or medial pterygoid muscle, if it is done intraoral, it will give us better information, with the index finger we go to the floor of the mouth and to the area of the molars where we will find the muscle, we palpate gently [13-15], this author considers that if he performs in both ways we will have more information in his palpation. In item four that refers to the pain of the TMJ, this author considers that it is insufficient to validate the TMJ, it will be necessary to palpate more areas of the TMJ to give it a significant value.

As this index was the pioneers in terms of the diagnosis of TMTs, and at that time (1968) there was controversy regarding the articular position of the central relationship [5] and for that reason the articular position was not clearly defined, so it was promptly displaced by other indices. In item seven that refers to the position of muscle contact between CR and MIC, this author considers it inappropriate, since, if the patient is due to some inflammatory process, he may not be so explicit in giving us truthful information regarding the four possibilities that exist in this item. (Annex 3). In items eight and nine, this author considers that to obtain a CR record, it will be necessary to deprogram the proprioception of the levator muscles, in addition to the bite register, in a semi-adjustable articulator, in order to record the condylar position. Therefore, this author considers that in items seven, eight and nine only a retrusive movement of the jaw is being made and not a CR position. Regarding the categorization that considers healthy, disturbance, risk and dysfunction, this author considers insufficient to quantitatively and qualitatively assess the TMTs(Annex 4). This valuation index was soon displaced by other simpler indices and with greater reliability and reproducibility, it is predictive, but it does not report the severity of the TMTs.

Conclusion

Although this analysis is widely used in dental schools in Europe, and especially in Denmark, this author considers that, at present, it does not allow us to give a more accurate diagnosis of TMNs, it lacks items to assess TMJ dysfunction, this author considers it incomplete and does not cover the expectations to diagnose and quantify the severity of TMD, as well as a treatment plan, based on your outcome.

References

1. Wright EF, Klasser GD (2020) Manual of Temporomandibular Disorders. Edit John Wiley & Sons, 2020. USA. (libro), p. 88-90.
2. de Leeuw R, Klasser GD (2018) Introduction to Orofacial pain. In Orofacial Pain: Guidelines for Assessment, Diagnosis and Management. American Academy of Oralfacial Pain 2018. Quintessence Publishing Co, Inc.
3. Okesson JP (2019) Tratamiento de oclusión y afecciones temporomandibulares (8th Edn.)., Madrid-España: Editorial Elsevier.
4. Farfán Verástegui LG (2014) Asociación entre sintomatología clínica de trastornos temporomandibulares y posición condilar según el índice de Krogh-Poulsen en escolares de 15 a 17 años de edad en el distrito de Moche.
5. Alvarado-Menacho S (2020) Importancia de los índices simplificados en el diagnóstico y estudio de los Trastornos Temporomandibulares. Rev Estomatol Herediana 29(1): 89-94.
6. Sardiña M, Casa J, Martínez I, Peñate C, Peñate D (2010) Factores de riesgo de la disfunción temporomandibularasociados al test de Krogh-Poulsen. Rev Méd Electrón 32(5): 0-0.
7. Schwartz L, Chayes C (1968) Facial pain and mandibular dysfunction. Philadelphia: WB. Saunders Co, pp. 236-280.

8. Mongini F (1983) The Stomatognatic System: Function, Dysfunction and Rehabilitation Chicago. Quintessence part Y. Ch 6 and 12.

9. Montero Parrilla JM, Semykina O, Morais Chipombela LC (2020) Trastornos Temporomandibulares y su interacción con la postura corporal. Revista cubana de estomatología 51(1): 3-14.

10. Cornejo Salazar JL, Sensibilidad y especificidad del índice Krogh-Poulsen en el diagnóstico de los trastornos temporomandibulares, odontología Sanmarquina vol.1 N 3.

11. Kroh-Poulsen WG, Olsson A (1996) Occlusaldysharmornies and dysfunction of thestomatognaticsystemDent Clinic North Am.

12. Krogh-Poulsen WG, Olsson A (1969) Management of theocclusion of thetrrth. In: Sxhwartz L. Chaynes CM (Eds.)., Facial pain and mandibular Dysfunction. Philadelhia W.B. Saunders Co, pp. 245-247.

13. Richard LD, AWayne V, Adam WM (2010) Gray Anatomía para estudiantes (2nd Edn.)., Barcelona España. ELSEVIER.

14. Latarjet, Ruiz Liard (2019) Anatomía Humana (5th Edn.)., Buenos Aires argentina. Editorial medica PANAMERICANA.

15. Juan A García- Porrero, Juan M Hurlé (2005) Anatomía humana; Madrid España. Editorial Mc GRAW-HILL-INTERAMERICANA DE ESPAÑA.

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