# Controversies on Anatomy and Function of the Ligaments Associated With the Temporomandibular Joint: A Literature Survey

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*Varying opinions are found in the literature regarding the role of the ligaments associated with the temporomandibular joint, eg, with respect to recording of mandibular positions and diagnosis and to treatment of patients with temporomandibular disorders. A literature survey was done to explore controversies of anatomy and function of the temporomandibular joint ligaments. Only 20 research-based anatomic/functional articles were registered in the Index Medicus system under the selected headings from 1897 to 1995. By examining the reference lists of the articles found, 22 more articles not included in Index Medicus were identified. Thus, the total number of original publications concerning the temporomandibular ligaments was limited. Although the conventional textbook descriptions of the anatomy of the ligaments are fairly consistent, there are several controversies and unanswered questions. Information about the functional role of the ligaments is especially insufficient. The results of this survey indicate that there is a need for additional anatomic and functional investigations of ligaments associated with the temporomandibular joint.*
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Some authors have regarded ligaments associated with the temporomandibular joint (TMJ), especially the temporomandibular (lateral) ligament, as important in the function of the masticatory system, and others have considered the function of these ligaments less important. An example of the suggested clinical importance is the possible influence on mandibular positions (ligamentous position)[1] and temporomandibular disorders (TMD), eg, for clicking[2] and disc displacement (constrained or slack ligaments).[3,4] Much attention and debate have also been addressed to the possible association between ear symptoms and TMJ dysfunction resulting from the presence or lack of presence of a tissue connection between the malleus and the TMJ, the discomalleolar ligament.[5,6]

Even if most current textbooks describe the anatomy of ligaments associated with TMJs in a similar way, there seem to be conflicting results in the literature. According to recent reviews, the function of these ligaments is uncertain, physiologic experiments are rare, and opinions appear to be based mainly on theoretical analyses.[7–9] Furthermore, the knowledge of the role of the ligaments seems to be limited in comparison to that of other struc-

Table 1 Distribution of Articles Identified From Index Medicus

| | Anatomic/ functional | Theoretic analyses | Clinical | Review | Total |
|---|---|---|---|---|---|
| 1879 to 1935 | | | | | |
| 1936 to 1945 | 1 | | | | 1 |
| 1946 to 1955 | | | | | |
| 1956 to 1965 | 1 | | | | 1 |
| 1966 to 1975 | 4 | 1 | 4 | 2 | 11 |
| 1976 to 1985 | 3 | | | 1 | 4 |
| 1986 to 1995 | 11 | 3 | 3 | 4 | 21 |
| Total | 20 | 4 | 7 | 7 | 38 |

tures of the TMJ. Therefore, the aim of this study is to survey the literature focusing on research-based information on anatomy and function of ligaments associated with the TMJ.

## Materials and Methods

The literature survey covered the period 1879 to March 1995, and was conducted at the Biomedical Library, Göteborg University, Göteborg, Sweden, by applying the Index Medicus and Medline systems (National Library of Medicine, Bethesda, MD). However, none of the ligaments associated with the TMJ, such as the temporomandibular (lateral), the stylomandibular, the sphenomandibular, and the discomalleolar (the fibrous connection between the malleus and the TMJ) ligaments are separate key words in the Index Medicus system. To identify these items, the key word *ligaments* was used in combination with the Medical Subject Headings (MeSH) terms *temporomandibular joint*, *malleus*, and *sphenoid bone*. From 1879 (the first year of the Index Medicus system) to 1965, the present literature survey was conducted manually. Additionally, the free text (non-MeSH) words *ligament*, *temporomandibular*, *spheno*, and *styloid* were used from 1976 to 1995. A computerized survey by the Medline database was possible for 1966 to 1995. The survey was limited to human material.

The articles, which contained information about the temporomandibular (lateral), sphenomandibular, stylomandibular, and discomalleolar ligaments, were registered, and the reference lists were further analyzed. The obtained articles were separated into anatomic/functional studies, theoretical analyses, clinical reports of surgical or physical treatments, and review articles. They were divided according to type of ligament and also to mandibular movements/positions and the connection between the TMJ and the middle ear. Even if not included in the search systems, some standard textbooks on TMJ anatomy have been consulted.[9–12]

## Results

### Distribution Over Time and Topics

Twenty anatomic/functional articles about the TMJ ligaments were identified in the Index Medicus system. Two articles[13,14] were found by hand searching articles from the period of 1879 to 1965. Furthermore, 18 articles[6,8,15–30] were identified by the Medline database from 1966 to 1995. Besides these anatomic/functional articles, 18 more papers were identified from 1879 to 1995: four theoretical analyses; seven clinical reports; and seven review articles. Thus, a total of 38 articles focusing on TMJ ligaments, all published after 1936, had been listed in Index Medicus systems (Table 1).

A manual search of these articles and some standard textbooks[4,7,9–12] identified 22 anatomic/functional articles.[5,31–51] When the 42 anatomic/functional articles were classified according to the selected topics, 17 were found to focus on ligaments and mandibular movement/position (Table 2) and 25 on the anatomic relation between the TMJ and the middle ear (Table 3). Three articles[8,31,32] combined information about the temporomandibular and the discomalleolar ligaments. These were classified based on the predominance of the content to the mandibular movement/position group. The other articles[13,15–18,33–40] concentrated on the temporomandibular ligament. One author[19] investigated the stylomandibular ligament in combination with the temporomandibular and sphenomandibular ligaments. Of the articles focusing on the connection between the TMJ and the middle ear, 11 articles[5,6,14,20–25,41,42] described both the discomalleolar ligament and the sphenomandibular

Table 2 Anatomic/Functional Articles Focusing on Mandibular Movement/Position

| | T | T, D | T, SP, ST | Total |
|---|---|---|---|---|
| 1879 to 1905 | | | | |
| 1906 to 1915 | | 1 | | 1 |
| 1916 to 1925 | | | | |
| 1926 to 1935 | | | | |
| 1936 to 1945 | 1 | | | 1 |
| 1946 to 1955 | 3 | 1 | | 4 |
| 1956 to 1965 | 3 | | | 3 |
| 1966 to 1975 | 2 | | 1 | 3 |
| 1976 to 1985 | | | | |
| 1986 to 1995 | 4 | 1 | | 5 |
| Total | 13 | 3 | 1 | 17 |

T = temporomandibular ligament; D = discomalleolar ligament; SP = sphenomandibular ligament; ST = stylomandibular ligament.

Table 3 Anatomic/Functional Articles Focusing on the Relation Between the TMJ and the Middle Ear

| | D | D, SP | Total |
|---|---|---|---|
| 1879 to 1905 | 1 | | 1 |
| 1906 to 1915 | | 1 | 1 |
| 1916 to 1925 | | | |
| 1926 to 1935 | | | |
| 1936 to 1945 | 1 | | 1 |
| 1946 to 1955 | 1 | | 1 |
| 1956 to 1965 | 4 | 1 | 5 |
| 1966 to 1975 | 2 | 2 | 4 |
| 1976 to 1985 | 2 | 1 | 3 |
| 1986 to 1995 | 3 | 6 | 9 |
| Total | 14 | 11 | 25 |

D = discomalleolar ligament; SP = sphenomandibular ligament.

ligament. The other researchers[26–30,43–51] limited their studies to the discomalleolar ligament.

All four theoretical articles[52–55] as well as the seven clinical reports[3,56–61] focused on the temporomandibular ligament and its influence on mandibular movement/position. Six[2,62–66] of the seven reviews covered the relation between the temporomandibular ligament and mandibular movement/position, and one[67] concentrated on the connection between the TMJ and the middle ear.

## Anatomic and Functional Aspects

**Temporomandibular Ligament.** *Anatomy.* The temporomandibular (lateral) ligament was described, in general, as a reinforcement of the lateral wall of the capsule, attached above to the tubercle and below to the mandibular neck.[9–12,32,35,68] Several articles[10,17,35] claimed that the lateral ligament consisted of two parts: a superficial oblique portion running laterally from the articular tubercle to the condylar neck, and a deeper more horizontal part from the same origin to the lateral pole of the condyle and the posterolateral margin of the disc. A controversial opinion was presented by Savalle,[18] who identified only three specimens with a distinguishable lateral ligamentous formation in his macroscopic and microscopic study of 16 human TMJs. More recently, Schmolke[8] used a sophisticated 3-dimension analysis based on five human heads and confirmed that the lateral wall of the capsule is stronger than in other regions. This reinforcement was interpreted as the lateral ligament, which partly inserted into the temporal fascia.

Although most textbooks seem to agree on the anatomic configuration of the lateral ligament, there is no consensus among researchers on a similar reinforcement of the other capsule areas. Dauber[39] found strong connective tissue enforcement in the joint capsule medially, posteriorly, and laterally, consisting of the pterygoid, parotid, and masseteric fasciae. This finding contrasted with that of Fenol et al,[40] who, in a histologic study of five TMJs, identified reinforcements medially and laterally but not anteriorly or posteriorly. A thickening of the posterior part of the capsule was observed by Årstad.[35] On the other hand, Schmolke[8] emphasized that capsular elements that directly connected the temporal bone and the mandible were seen only on the lateral side of the joint, lacking medial reinforcement in the capsule. A diplomatic solution of this controversy is to consider the capsule a ligament, as proposed by Ten Cate.[9]

In contrast to the conventional description of one single TMJ on each side, it has been claimed by Fenol et al[40] that each side consists of two articular complexes (a "supra and inframeniscal compartment" or a "meniscotemporal and a condylomeniscal" joint) acting independently. This finding was substantiated by the description of separate capsules for each of these joints: a "series of short bands passing from the meniscal circumference to the periphery of the articulating surface of the temporal bone and from the condylar neck to the meniscal circumference."[40] This opinion has not been verified by other investigators.

*Function.* It is usually proposed that the main biomechanical function of the temporomandibular ligament is to control and limit condyle-disc move-

ments—a function similar to that of the collateral ligaments of other joints.[9,11] The plication of the slack capsular ligament in patients with recurrent dislocation of the TMJ is a clinical approach based on the assumed function of ligaments to limit joint movements.[3,56] In recent years, it has been hypothesized that general joint laxity may be a predisposing factor in TMD,[69] although these results have not been replicated consistently. The possible association between the loose joints and the TMD should be studied further.[4,70,71] Functional analyses of the mechanical contribution of ligaments to joint motion have been presented[53,72,73] based on joint morphology and biomechanical assumptions, eg, that the ligaments are inextensible. However, there is no such consensus, and a textbook[12] of anatomy stated that the ligaments are "slightly elastic and protected from excessive tension by reflex contraction of appropriate muscles." These analyses may be a useful foundation for further research, but the hypotheses have not yet been tested in direct experiments on living subjects.[7] One study[16] reported electromyographic activity from muscle tissue located in the temporomandibular ligament, which the authors had discovered in an earlier study. This result is questionable because muscle fibers in the temporomandibular ligaments have not been reported by other researchers. However, Thilander[36] identified Golgi tendon organs in the superficial layers of the temporomandibular ligament. These nerve endings are important for the neuromuscular control of jaw movement.[9,74]

**Sphenomandibular Ligament.** *Anatomy.* The common textbook[9,12] describes the sphenomandibular ligament as a ligament that connects the medial side of the mandible with the cranium by running from the lingula above the opening of the inferior alveolar canal to the spine of the sphenoid. However, early observations by one investigator[44] maintained that the cranial attachment is located on the inner side of the glaserian fissure, and on its way to that structure, it is attached to the sphenoid spine only at its inner edge. This investigator stated that some sphenomandibular fibers pass into the tympanum submerging into the fibrous layer of the membrana tympani, better known as the anterior ligament of the malleus. These observations were later verified.[20] In the study by Burch[20] on 25 adult human cadaver heads, about one third of the sphenomandibular ligament attachment was found to be inserted into the sphenoid spine. The remaining part was continuous with the medial TMJ capsular tissue or entering the petrotympanic fissure.[6] A similar finding was presented by Schmolke[8] using histologic sections.

*Function.* From theoretical analyses using a mathematic approach, it has been assumed that the sphenomandibular ligament controls the late phase of jaw-opening, while the first phase is controlled by the temporomandibular ligament.[53,73] No direct experimental evidence of its functional role seems to exist. In an experiment using artificial ligaments of unelastic bands on a skull, the sphenomandibular ligament had no effect on jaw opening but provided a limitation of lateral movement.[52] A current opinion is that the role of the sphenomandibular ligament in mandibular mechanics is negligible.[12]

**Stylomandibular Ligament.** *Anatomy.* The stylomandibular ligament is generally described as a reinforced part of a fascial lamella that extends from the styloid process and styloid ligament to the region of the mandibular angle, partly attached to the mandible, but with the majority of fibers blending into the fascia on the medial surface of the medial pterygoid muscle.[10] Although several articles concerning the stylohyoid ligament were found, only one study, which was done by Burch,[19] concerned the anatomy of the stylomandibular ligament.

*Function.* The stylomandibular ligament becomes slack during mouth opening but is tightened during protrusion and mandibular overclosure.[10,19] Burch[19] observed in his study on one cadaver that the contralateral ligament was tightened during maximal lateral excursion. This has been supported later by Hesse and Hansson[73] in their review. However, in experiments with artificial ligaments, Rossow[52] showed that the stylomandibular ligament had no influence on jaw movements, not even protrusion. This review supports the opinion expressed by Williams et al[12] that this ligament has uncertain function.

**Discomalleolar Ligament.** *Anatomy.* A connection of fibrous tissue between the TMJ and the middle ear passing through the petrotympanic fissure was described early.[43] In a histologic study of 20 TMJ specimens, Pinto[5] observed "a tiny ligament...connecting the neck and anterior process of the malleus to the medioposterosuperior part of the capsule, the interarticular disc, and the sphenomandibular ligament." The consistency and especially the functional importance of this observation have been much debated.[22] Loughner et al[6] found a separate and distinct structure corresponding to a discomalleolar ligament in only 15 of 52 specimens. Cesarani et al[30] demonstrated the y-shaped form of the anterior ligament of the malleus, one arm of which reaches the capsule of the TMJ and the other the pin of the sphenoid bone.

Eckerdahl[42] emphasized in his large material the great individual variation of both the size of the petrotympanic fissure and its fibrous content.

*Function.* Pinto's observation[5] of a functional connection between the middle ear and the TMJ (movement of the tiny ligament, the chain of ossicles, and the tympanic membrane by movement of the TMJ capsule) was supported by Coleman.[41] However, it has been refuted by several investigators who could not find that tension applied to the ligament caused any movement of middle ear structures.[6,22,28] Eckerdahl[42] concluded that his results regarding the morphologic pattern of the soft tissues within the petrotympanic fissure did not support the opinion that forces may be transferred from the joint to the middle ear. This opinion was supported by Schmolke,[8] who stated that the connective tissue fibers had no functional relevance but were probably merely developmental remnants. Adding to the confusion in this matter is the connection found by some investigators between the discomalleolar and sphenomandibular ligaments. In a study on cadavers, tension of the sphenomandibular ligament moved the malleus in three of 52 specimens.[6] These authors[6] concluded, based on these observations and reports of middle ear damage during TMJ surgery, that extensive distraction of the mandible during TMJ surgery should be avoided.

From the survey it may be concluded that most authors deny any functional importance of the discomalleolar ligament in relation to TMD.

## Discussion

### Number of Articles and the Index Medicus and Medline Systems

In 1995, the Medline system contained information from approximately 3,700 journals from more than 70 countries. It corresponds to the printed Index Medicus. These systems give excellent possibilities to find relevant literature for overviews in specific areas. The computerized Medline system is impressive and efficient and makes otherwise unattainable literature easily accessible.[75,76] It must be remembered, however, that these search systems do not cover all literature, and this was even more so in earlier years. Additional hand searching of references of the registered articles and selected textbooks should complete the survey.

Our survey covered the period from 1879, ie, the year when the Index Medicus was started, to the present. It is evident that much valuable anatomic research existed before that. In fact, some of the early textbooks referred to investigations from the 18th and 19th centuries. As shown recently,[77] current anatomic research can find interesting contributions for the study of TMJ anatomy by scrutiny of such early observations. This was, however, beyond our ambitions with this review.

During the period February 1993 to March 1994, the Medline system had registered 397 articles on the ligaments associated with the knee joint but only 8 articles on TMJ ligaments. During the same period, 202 articles were found on the TMJ. Literature on TMD is even more prolific. A recent review[76] showed that about 4,000 references to TMD were identified from 1980 to 1992.

In consideration of the many unanswered questions on the role of the TMJ ligaments, the number of studies identified seems to be limited, and further investigations of the anatomy and function of these structures appear to be warranted.

### Ligaments Associated With the TMJ

The most commonly described ligament associated with the TMJ is the temporomandibular or lateral ligament. It is interesting to note that the existence of this standard textbook ligament has been questioned.[18] There is also lacking consensus on the issue whether there are ligamentous structures in the other parts (eg, medially or posteriorly) of the capsule. The sphenomandibular and stylomandibular ligaments are sometimes called accessory ligaments of the TMJ. They did not receive much research interest in the period covered by our review, and their functional importance is uncertain. The discomalleolar ligament, although not mentioned in many anatomic texts on the TMJ, was in fact more frequently studied than the previous ones, because of the suggested connection between TMD and ear symptom.

Other names of ligaments associated with the TMJ have also appeared in the literature, eg, *condylomeniscal ligament*,[15] *menisco-ligament*,[61] *medial capsular ligament*,[35] *retrodiscal ligament*,[78] and *bilaminar posterior ligament*.[79] The tiny ligament that Pinto[5] presented has later been called the *discomalleolar ligament*.[6,22] It is obvious that there is a lack of uniformity of terminology and definitions of the ligaments associated with the TMJ.

### Temporomandibular Disorders and Ligaments Associated With the TMJ

Subluxation or recurrent dislocations are often attributed to inadequate capsular and ligamentous

properties. Slackness of the joint capsule has also been suggested to be treated surgically by a plication procedure.[3,56] A more dubious method sometimes recommended for the same purpose was the intra-articular and periarticular injection of sclerosing solution. Disc-interference disorders have been suggested to be associated with general joint laxity and hypermobility. Pinkert[2] indicated that clicking may result from overstraining of the lateral ligament of the TMJ. The role of TMJ ligaments in such a relationship has not been substantiated,[4] but this seems to be an area that should be researched. Early anatomic studies[20,44] stated that if the sphenomandibular ligament was not attached to the sphenoid bone, some control of mandibular movement would be lost and a medially sideway displacement of the mandible might occur. However, we could not find any documentation of a relation between this ligament and TMD.

The great number of articles about the discomalleolar and sphenomandibular ligaments and their connection with the malleus can be explained by the interest evoked by the suggested relationship between TMJ dysfunction and the middle ear.[5,80,81] The fibrous tissue connection between the TMJ and the middle ear through the petrotympanic fissure is well documented not only in the embryologic stage but also in the adult. The functional significance of this connection as suggested by Pinto[5] is not accepted any longer. However, some experimental evidence exists that tension of the sphenomandibular ligament can move the malleus.[6,20] Eckerdahl[42] emphasized the great individual variation in his large material of both the size of the petrotympanic fissure and its fibrous content, which might explain differences in observations and interpretations found in the literature. The common sensory innervation of the two areas (the tensor tympany muscle and muscles of mastication), the common embryologic development, and a remaining connection in the adult may explain some ear symptoms in relation to TMD.[11,42]

### Mandibular Movements/Positions and Flexibility of the TMJ

The capsule and ligaments are generally considered to give biomechanical constraints to protect the joint against excessive movements in different directions. Analogically, the temporomandibular ligaments are described to control and limit movements of the condyle-disc complex of the TMJ. There is only little experimental evidence of this influence on mandibular movements. Unilateral and bilateral anesthesia of the lateral part of the TMJ increased the active maximum mouth opening by 10% and 15%, respectively.[82] No changes of the other mandibular border movements were reported. It is not clear from this experiment if the result was an effect of inhibition of a protective mechanism, eg, reflex activity of the jaw closing muscles, or a direct influence on the capsule and the temporomandibular ligament. The possible functions of the other ligaments on mandibular mobility described above are largely based on morphologic and theoretic analyses, or in a few cases on cadaver experiments, and they lack direct evidence from living subjects.[7]

Since the end of the 1940s, much interest has been focused on the possible role of the temporomandibular ligament in limitation of the retrusion of the mandible. It is well established, by the work of Posselt[34] and others, that in the great majority of people it is possible to retrude the mandible to a position posterior to the intercuspal position by applying an external force. This retruded position is reasonably well reproducible and recordable and was considered by Posselt[34] and Årstad[35] to be a posterior border position because of the stretching of the practically nonelastic capsule and deep portion of the temporomandibular ligament. The most retruded mandibular position was referred to as the *ligamentous position*.[1] The importance of the ligaments for this retrusion has been questioned because of experimental sectioning of the ligament on cadavers with conflicting results[33,34,37,38] and the fiber orientation of the temporomandibular ligament.[15] In recent years, the term *ligamentous position* is hardly used. The forceful retrusion of the mandible in jaw-recording procedures has been questioned, and it is not considered appropriate for obtaining a centric relation position of the mandible.[83]

The stretching of the superficial part of the temporomandibular ligament has been shown to limit the posterior opening (hinge movement) of the mandible.[13,34] Both restriction of mandibular movement and retruded mandibular position might be related to the flexibility of the TMJ capsule and/or the ligaments associated with the TMJ. It is no reason to question the textbook description that the role of ligaments is to control excessive movements, prevent the joint from subluxation or dislocation, and constrain and guide joint motion.[9,84] However, there is no consensus on whether the ligaments are nonelastic or lightly elastic collagenous structures.[12,53] The observation by Savelle[18] that some individuals lacked temporomandibular ligaments

and the different descriptions by many authors of ligamentous reinforcements in other parts of the capsule may partly help to explain the varying joint flexibility.

## Conclusion

The Index Medicus and Medline systems offer excellent possibilities for literature surveys. It must be remembered, however, that not all the relevant literature is covered, and several of the registered articles are not accessible in conventional libraries of universities. An additional manual search in the references of the recorded articles and in selected textbooks is necessary.

The conventional textbook descriptions of the anatomy of the TMJ ligaments are fairly consistent, but there are still some controversies and unanswered questions. Recent anatomic research has revealed new findings, eg, on capsular reinforcement and connections between the TMJ and the middle ear. However, there is a lack of modern micromorphologic and biochemical methods in the study of TMJ ligament structure. This indicates that new approaches and methods are desirable to give answers to still debatable issues with respect to TMJ anatomy.

Knowledge of the function of TMJ-related ligaments is incomplete and is mainly based on speculations from morphologic and theoretic analyses from cadaver or skull experiments. More direct experimentation is needed to better elucidate ligament function concerning, for example, influence of ligaments on mandibular movement and position, and on the possible relationship between TMJ dysfunction and ear symptoms.

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## Resumen

### Controversias sobre la anatomía y función de los ligamentos asociados con la articulación temporomandibular: Revisión de la literatura

Se encuentran varias opiniones en la literatura en relación al papel de los ligamentos asociados a la articulación temporomandibular (ATM), por ejemplo, con respecto al registro de las posiciones mandibulares y al diagnóstico lo mismo que al tratamiento de pacientes con desórdenes temporomandibulares. Se realizó una revisión de la literatura para explorar las controversias de la anatomía y la función de los ligamentos de la ATM. Sólo se encontraron 20 artículos basados en investigaciones anatómicas/funcionales en el sistema, bajo los encabezamientos seleccionados entre 1897 y 1995. Al examinar las listas de referencia de los artículos encontrados, se identificaron 22 artículos no incluidos en el Index Medicus. Por lo tanto, el número total de publicaciones originales concernientes a los ligamentos temporomandibulares fue limitado. Aunque las descripciones convencionales de los textos sobre la anatomía de los ligamentos son claramente consistentes, existen varias controversias y preguntas no respondidas. La información acerca del papel funcional de los ligamentos es particularmente insuficiente. Los resultados de esta revisión indican que existe una necesidad de realizar investigaciones funcionales y anatómicas adicionales de los ligamentos asociados a la ATM.

## Zusammenfassung

### Kontroversen um Anatomie und Funktion der Ligamente des Kiefergelenkes: Eine Literaturübersicht

Man findet in der Literatur verschiedene Meinungen betreffend der Rolle der Ligamente des Kiefergelenkes, zum Beispiel hinsichtlich der Aufzeichnung von Kiefergelenkpositionen und Diagnosen und der Behandlung von Patienten mit Myoarthropathien des Kausystems (MAP). Es wurde eine Literaturübersicht erstellt, um kontroverse Meinungen bezüglich Anatomie und Funktion der Kiefergelenkligamente zu sammeln. Nur 20 auf Forschung basierende Artikel über Anatomie und Funktion waren im System zwischen 1897 und 1995 unter den ausgesuchten Titeln registriert. Nach Durchsicht der Literaturlisten der gefundenen Artikel konnten 22 weitere Literaturstellen gefunden werden, die nicht im Index Medicus eingetragen waren. Die totale Anzahl der Originalpublikationen über die Ligamente des Kiefergelenkes war also recht limitiert. Obwohl die anatomischen Beschreibungen der Ligamente in den Lehrbüchern ziemlich konsistent sind, bleiben einige Kontroversen und unbeantwortete Fragen. Vor allem ist die Information über die funktionelle Rolle der Ligamente ungenügend. Als Resultat folgt aus dieser Literaturstudie, dass ein Bedürfnis nach mehr anatomischen und funktionellen Untersuchungen der Kiefergelenkligamente besteht.