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Case Report
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Extraskeletal chondroma of the masseter muscle: a case report with review of the literature

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Abstract. The authors report a case of soft tissue chondroma of the masseter muscle in a 49- year-old man. The tumour was entirely composed of lobules of hyaline cartilage. The literature on head and neck soft tissue chondroma is also reviewed. To the authors' knowledge, this is the first case of muscular soft tissue chondroma in the head and neck region.

Keywords: soft tissue; cartilaginous; tumour.

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Benign extraosseus cartilaginous tumours are uncommon and usually present as discrete, ossified masses localised in soft tissues. Juxtacortical chondroma, also known as periosteal chondroma, arises from the periosteal region of the long bone or a small bone of the hand or foot[30,43]. When occurring in extraosseous and extrasynovial locations, it is known as extraskeletal or soft tissue chondroma[12].

Soft tissue chondroma generally affects the soft tissue of the hands and feet[26,43] in the third and fourth decades of life[26]; it occasionally occurs in the abdominal wall, and head and neck[10]. In the head and neck area, the most reported sites are the nasal cavity, paranasal sinuses, larynx[10] and tongue[7,24], less frequently, it has been described in the soft palate[13], tonsil[46], masticatory space[10], parotid gland[3,18,22] and cheek[4,16,18,26]. Uncommon sites are the fallopian tubes[15], ovaries[29] and lungs[27].

The authors describe a soft tissue chondroma of the left masseter muscle in a 49- year-old man. To the authors' knowledge, this is the first case of chondroma reported at this site.

Case report

A 49-year-old man was admitted with a 6 year history of swelling in the left preauricular region that had increased in the last year. Clinical examination revealed a 5 cm diameter, well-circumscribed nodule, covered by normal skin in the left preauricular region (Fig. 1A); it appeared firm and painless, and floating in superficial planes.

Ultrasound examination revealed a well-circumscribed, 4 cm diameter, nodular mass in the masseter muscle with a non homogeneous hypoechoic structure and calcifications (Fig. 1B).

A computed tomography (CT) scan confirmed the presence of a non homogeneous density nodule in the left masseter muscle (Fig. 1C). Fine-needle aspiration cytology of the mass was performed suggesting a diagnosis of mixed tumour of the parotid gland. The lesion was surgically excised. A 'face lift' cutaneous incision was made in the parotid region and the common trunk of the facial nerve was isolated. Myotomy of the masseter muscle was carried out, and the mass was removed (Fig. 1D). The parotid gland was returned to its original position.

The specimen was a 4 cm, well-circumscribed nodular mass (Fig. 2A). The cut surface was thickened and translucent with a central calcified area (Fig. 2B).

Histological examination showed a well-circumscribed, lobulated mass composed of nodules of hyaline cartilage surrounded by condensed, collagenous tissue (Fig. 2C). There was variation in cellularity within the lesion and the chondrocytic lacunae varied in size (Fig. 2D). Mitotic figures were not seen and there was no evidence of atypia, necrosis or vascular invasion. The tumour was entirely pro-

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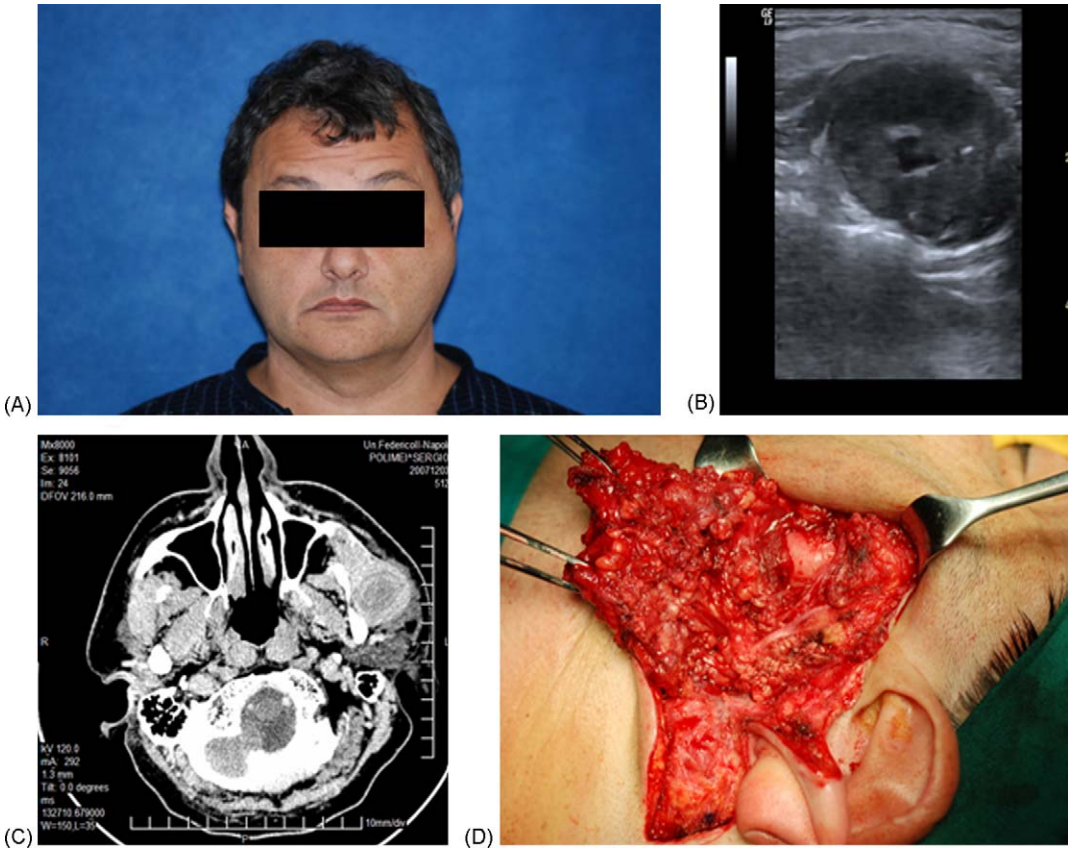

Fig. 1. (A) Clinical image showing swelling in the left preauricular region. (B) Ultrasound reveals a 4 cm intramuscular hypoechoic mass with calcifications. (C) CT image demonstrates a tumour mass in the left masseter muscle. (D) Intraoperative image shows a tumour within the masseter muscle.

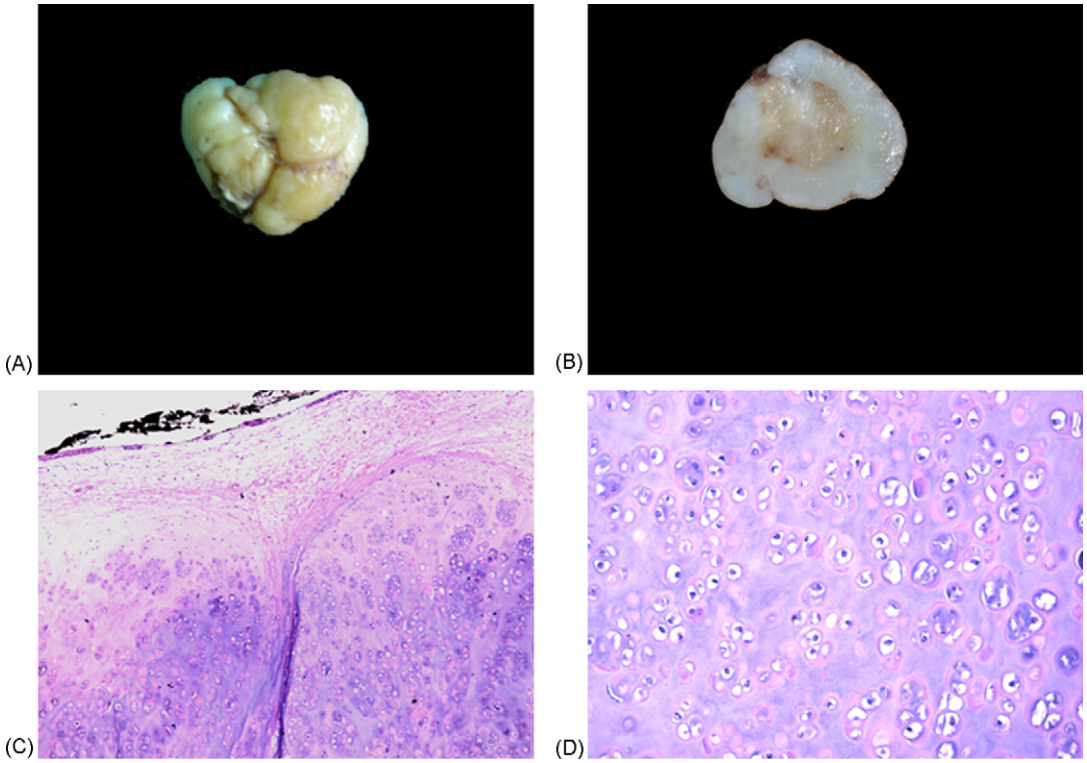

Fig. 2. (A) Gross appearance of the lesion showing a mass with an irregular outer surface and translucent cut section (B). (C) Lobules of hyaline mature cartilage surrounded by a thin fibrous capsule (H/E, 10x). (D) At high power, chondrocytic lacunae with mild atypia are evident (H/E, 20x).

Table 1. Review of literature on soft tissue chondroma of the head and neck.

Author	Age	Sex	Location	Duration of disease	Dimension (cm)	IHC
Bruce 1953[5]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Rosen 1961[31]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Yoel 1965[49]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Ramachandran 1968[28]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Hankey 1968[16]	*60*	*F*	*Cheek*	*31 years*	*4x4x3*	*NA*
Huppertz 1969[18]	*26*	*F*	*Cheek*	*2 years*	*8x5x3*	*NA*
Viglioglia 1970[44]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Samant 1971[32]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Gutmann 1974[14]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Zegarelli 1977[50]	*NA*	*NA*	*tongue*	*NA*	*NA*	*NA*
del Rio 1978[11]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Jungueira 1982[20]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Yasuoka 1984[48]	*40*	*M*	*Tongue*	*NA*	*NA*	*NA*
Segal 1984[36]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
	NA	*NA*	*Tongue*	*NA*	*NA*	*NA*
Sambo 1986[33]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Ling 1986[23]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Van der Wal 1987[42]	*61*	*F*	*Tongue*	*NA*	*NA*	*NA*
Aguirre 1988[1]	*53*	*M*	*Tongue*	*NA*	*NA*	*NA*
Tani 1989[41]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Ishibashi 1989[19]	*79*	*F*	*Tongue*	*NA*	*NA*	*NA*
Yamanaka 1989[47]	*20*	*F*	*Tongue*	*NA*	*1.50*	*NA*
Sanchez-Aniceto 1990[34]	*61*	*M*	*Tongue*	*NA*	*NA*	*NA*
Munro 1990[24]	*NA*	*NA*	*Tongue*	*NA*	*NA*	*NA*
Kostopoulos 1993[22]	*32*	*M*	*Parotid gland*	*NA*	*NA*	*S-100+*
Blum 1993[4]	*60*	*F*	*Cheek*	*1 year*	*1*	*NA*
Kamysz 1996[21]	*5*	*F*	*Neck*	*9 months*	*NA*	*NA*
Wang 1998[45]	*20*	*M*	*Parapharyngeal space*	*2 years*	*NA*	*NA*
Sera 2005[37]	*17*	*M*	*Tongue*	*NA*	*NA*	*NA*
Onodera 2005[26]	*47*	*F*	*Cheek*	*NA*	*4x2x2*	*S-100+, vim+*
Aslam 2006[3]	*47*	*F*	*Parotid gland*	*2 years*	*4x3x2*	*S-100+, vim+*
De Riu 2007[10]	*47*	*M*	*Masticatory space*	*NA*	*3.5*	*S-100+, vim+*
Vazquez Mahia2007[43]	*54*	*F*	*Preauricular region*	*4 years*	*2.5x2.5*	*NA*
Scivetti 2008[35]	*51*	*F*	*Tongue*	*NA*	*0.5*	*S-100+*
Present case	*49*	*M*	*Masseter muscle*	*6 years*	*4*	*S-100+*

IHC: immunohistochemistry; NA: not available; vim: vimentin.

cessed and serially sectioned but no epithelial components were observed. Immunohistochemically, the tumour cells were strongly positive for S-100 protein, and negative for smooth muscle and myoepithelial markers.

Discussion

The authors report a rare case of a primary benign cartilaginous tumour in the masseter muscle of a 49- year-old male of 6 years' duration. Extraskeletal chondromas are benign tumours arising in soft tissues unrelated to the bone.

The aetiology of soft tissue chondromas is unknown but it is thought that they arise from residual embryonic tissue or from metaplastic pluripotential mesenchymal cells[10,39]. The tumour cells probably arise from uncommitted mesenchymal stem cells either by metaplastic or neoplastic processes. Theories about their origin vary, YASUOKA et al. suggested that tongue chondromas develop from residual embryonal tissue in an area of fetal cartilage, or from pluripotent mesenchymal cells that undergo metaplasia and differentiate into cartilage as a result of an irritating stimulus[15,48]. In the fallopian tube, the tumour could develop from the mesenchyme of the myosalpinx or subcoelomic mesenchyme of the tubal serosa[38].Chondromas and cartilaginous tumours have also been studied cytogenetically[6,40].

Chromosomal alterations are not random, but can be associated with specific tumour types and their location. Tallini et al. have found cytogenetic similarities and common occurrence of 12q13-15 or +5 alterations in synovial/parosteal or soft tissue chondromas strongly supporting the hypothesis of a common origin for all these lesions[40]. Abnormalities of chromosomes 5, 6, 7 and 12, and of chromosomal regions 6q13, 12q13 and 17p13 are shared by malignant and benign cartilaginous tumours[6].

The masseter muscle is located in the masticatory space. Chondromas arising in the masseter muscle are difficult to recognize clinically and can be mistaken for salivary gland tumours[17].

Radiologically, soft tissue chondromas can show irregular calcification without involvement of underlying bone. The most common pattern of calcification is curvilinear, as in the present case[15].

The present case was clinically and cytologically mistaken for a salivary gland tumour, although histologically a clear diagnosis of cartilaginous tumour was made. Even serially sectioned epithelial cells were not recognized. Although appearing benign, a full skeletal survey must be carried out to exclude a well-differentiated skeletal chondrosarcoma, which occasionally metastasises to skin. Well-differentiated extraskeletal chondrosarcoma is rare[17]. Ectomesenchymal chondromyxoid tumour[2,25] must also be considered. It is most often described in the oral cavity[2], particularly in the tongue[2] but also in the hard palate[25]. It is a well-circumscribed, but unencapsulated, lesion with a lobular growth pattern and various degrees of cellularity setting in a myxoid, chondroid or hyalinized background. Immunohistochemistry is useful because tumour cells are positive for antibodies

directed against glial fibrillary acidic protein, cytokeratins, S-100 protein and CD-57[2,25].

To the authors' knowledge, this is the first case of primary intramuscular chondroma arising in the masseter muscle. In two comprehensive reports of extraosseus chondroma the predominant location of this tumour was in the hands and feet[8,9].

A review of the literature on head and neck soft tissue chondromas (Table 1) disclosed 34 cases of soft tissue chondromas occurring in the head and neck region, of which 24 were in the tongue[1,3,11,14,19–20,23–24,28,31–37,41–42,44,47,49–50], 4 in the cheek[4,16,18,26], 2 in the parotid gland[3,22], 1 in the parapharyngeal space[45], 1 in the preauricular region[43], 1 in the neck[21] and 1 in the masticatory space[10]. The age range of the patients was 5–79 years. Soft tissue chondroma is more common in females than in males (even though the patient's gender was not available in 16 cases) and the most common site is the tongue. The lesion has a slow and indolent course and occasionally is present for many years[16]. The treatment of choice is a wide local excision owing to the high recurrence rate of 10–15%[15].

In conclusion, the authors have recorded a rare location for soft tissue chondroma of the head and neck region, clinically mistaken for a salivary gland tumour.

Competing interests

None declared

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Ethical approval

Not required

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