Review Article

OSTEOID OSTEOMA OF JAWS: REVIEW ARTICLE

Mohammad Zanul Abedeen[1], Meghanand T Nayak[2], Sunitha JD[3], Geetanshu Dawar [4], Shilpa Dutta Malik[5], Zafar Akbar[6]

1-Post graduate student, department of Oral Pathology & Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India
2-Professor & Head, department of Oral Pathology & Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India
3-Professor, department of Oral Pathology &Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India
4-Reader, Oral Pathology & Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India
5- Senior Lecturer, Oral Pathology & Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India
6- Post graduate student, department of Oral Pathology & Microbiology Teerthanker Mahaveer Dental College and Research Centre,Moradabad, Uttar Pradesh, India

Abstract

Osteoid osteoma (OO) is known to be a neoplasm with low growth or, even more, an inactive neoplasm. It is the third most commonly diagnosed benign bone tumor and has distinctive symptomatology, nocturnal pain that relieves with nonsteroidal anti-inflammatory drugs. Osteoid osteoma is an osteoblastic benign bone tumor that is more common in young male patients with long bones. Less than 1 % of OO have been reported in the jaws. To our knowledge, all the cases of osteoid osteomas in the jaws that are documented in the scientific literature have been reviewed in this article.

Key words: Osteoma, Osteoid, Bony Lesions, Jaws.

Introduction:

Osteoid osteoma is a benign, solitary, painful well confine tumor of spongy bone and having osteoblastic origin.(1) Jaffe in 1935 described OO as a specific benign bone tumor having nidus of 2 cm in diameter. He also identified the tumor as an atypical hard osseous core made of tightly set trabeculae of newly formed bone. It represents 3% of all primary tumors of bone, and about 10% of benign bone tumors. Approximately 80% of osteoid osteoma (OO) occurs in long bones, while < 1% occurs in jaws.(2) it's commonly seen between age of 5 to 25 years.(1,2) It is particularly rare in patients more than 30 years of age. However OO has been reported in patient aged 69 years.(3)

Etiopathogenesis

Jaffe and Lichtenstein have proposed that OO is a true bony neoplasm derived from osteoblastic origin. However other workers have reported that the lesion occur due to trauma and inflammation.(4) Some have also suggested it to be variants of chronic sclerosing osteomyelitis.(5) It is debated that the root of osteoid osteomas may be neoplastic or infectious at source. (6)

Clinical presentation:

Osteoid osteoma frequently seen in the second and third decades of life. osteomas occur most often in the femur, tibia and phalanges. They are very infrequent in the jaws but if occur, there is mandibular predominance.(1)

Eventually 31 articles reporting of an osteoid osteoma in the jaws were selected. Such cases are summarized in Table 1.

Most cases of osteoid osteoma in the jaws occurred during the mean age (36.5 years). It happens in women more frequently than in men (female to male ratio of 2: 1.75). After reviewing the OO cases of jaws, it was clearly found that mandible was

more common than the maxilla (n=25). Within the mandible, the most frequently affected site was the body of the mandible. The most common complaint presented in the reported cases was pain and swelling. And very few cases also clinically documented with tenderness, restricted mouth opening & hearing loss. In the literature clinically size of OO were presented ranging from 0.8 - 7.0×6.5 cm.

Most characteristic clinical feature of osteoid osteoma is pain. The lesion consists of a small nidus containing nerve fibers, vascular components and very high prostaglandin levels that induce a chronic reactive alteration in the surrounding bone, resulting in marked periosteal sclerosis and synovitis surrounding it. [6]

Pain in the OO is usually considered due to the vasodilation of the prostaglandin within the nidus results increased pressure in the intra-cortical bone in turn stimulates the peripheral nerves. The prostaglandin in turn, also stimulates the bradykinin system, a powerful vasodilator, which in turn adds the pain to the lesion. It has been noticed that production of prostaglandin was decreased by the Nonsteroidal anti-inflammatory drugs and salicylates and improved the symptoms. [7,8,9]

Radiographic features:

In general, OO's shows classical radiological appearance as a thin, intracortical radiolucent nidus, which is usually < 1 cm in diameter. A wide and dense cortical bone thickening is seen surrounding the nidus sclerotic region. According to the Jaffe such radiological characteristics are the definitive diagnostic feature of this lesion. The nidus radiodensity is usually surrounded by a variable thickness of radiopacity. Radiopaque nidus is considered to be a less mature lesion, while radiolucent nidus as fully mature.[10] On review of OO of jaws, radigraphically radiopacity was more seen than the radiolucency in all documented cases in the literature.

In the diagnosis of OO lesions, advanced imaging modalities such as computed tomography and scintigraphy are considered a valuable adjunct.[10]

Histologic features:

Huvos has explained distinct three histological stages of OO. In a highly vascularized stroma, tightly packed and actively proliferating osteoblasts are seen in the initial stage. The osteoid deposition of the intermediate step between the osteoblasts is seen. The osteoid slowly turns into a well-calcified compact atypical bone at the mature stage, which is generally neither woven nor lamellar in nature. [11,12]

Diagnosing Criteria:

Jaffe in 1935, had established certain criteria to diagnose OO: a) benign neoplasm; b) formed large amounts of osteoid which became calcified; c) an inflammatory process; d) characteristic radiographic changes, such as focal rarefaction and reactive bone formation; e) occurred most frequently in young adults; f) an outstanding feature of pain; and g) complete removal as the treatment of choice.

Differential diagnosis:

For the above-mentioned case, ossifying fibroma, peripheral osteoma and osteoblastoma are considered as differential diagnosis. Ossifying fibroma and peripheral osteoma are typically asymptomatic in nature, and these lesions increases in size, causes displacement and resorption of teeth. Moreover they lack lesional nidus which is characteristic of OO. Osteoblastoma and OO are very similar lesions clinically, radiographically and histologically. [10] The radiographic features of osteoblastoma are variable and nonspecific.[11] While pain is a common feature of both lesions, pain associated with OO subsides to aspirin and

other non-steroidal anti-inflammatory medications, while osteoblastoma is not.[10]

Treatment:

Complete excision is the treatment of choice for the OO which relieves pain. Recurrences of OO are rare after complete excision of the lesion, But recurrences have been reported in some cases.However, some of the reported cases of OO have shown spontaneous regression.[13,14,15] Such cases are difficult for the diagnosis in the later stages of the lesion. Sarcomatous or local malignant transformations are very rare.[16] After reviewing the cases of OO of jaws, Only in a single case has the malignant transformation of osteoid osteoma been reported.[17] Hence, follow-up for long period of time is suggested to identify Sarcomatous or local malignant transformations.

Conclusion:

Very few cases of OO of jaws have been reported in the literature. Knowing the OO by the dentists, oral surgeons and pathologists is important so as to improve the identification, diagnosis and treatment. OO should always be considered in differential diagnosis if bony growths are observed in the jaws of adolescent and young adults. This article with its clinical findings, diagnosis and management provided a thorough review of this rare lesion.

Table. 1 Documented cases of osteoid osteoma in the jaws previously published in the scientific literature.

Case No.	Reference	Age (yr)/ gender	Site	Clinical manifestation	Radiographic feature	Radiographic size (cm)	Clinical size
1	Rushton et al.(1951)[20]	27/M	Left posterior mandible	Tender	No findings	NS	NS
2	Foss et al. (1955)[21]	36/F	Left posterior mandible	Pain	Translucent nidus surrounded by sclerotic bone	1.5×0.7	4.0×1.7
3	Nelson et al. (1955)[22]	17/M	Right posterior maxilla	Pain, swelling	Radioluscent center with radiating spicules of trabecular bone	NS	2.5
4	Stoopack et al. (1958)[23]	25/M	Left posterior mandible	Asymptomatic	Central radioopacity with surrounding thin radioluscency	NS	NS
5	Lind et al. (1965)[24]	48/M	Right condyle	Pain	NS	NS	NS
6	Hillman et al. (1965)[25]	4/F	Left posterior maxilla	Swelling	NS	NS	NS
7	Greene et al. (1968)[26]	45/F	Right posterior maxilla	Pain, tender	Central radioopacity with surrounding less dense trabeculated bone	NS	NS
8	Brynolf et al. (1969)[27]	77/M	Anterior maxilla	NS	Central density with radioluscent ring surrounded by increased radioopacity	0.4	NS

9	Dechaume et al. (1985)[28]	22/M	Mandibular left angle	NA	NA	NA	1.0
10	Gupta et al. (1985)[29]	18/F	Left posterior mandible	Pain, swelling	Ill-defined radioluscency surrounded by sclerotic bone	NS	3.0
11	Lolli et al. (1987)[30]	46/F	Left mandibular angle	NA	NA	NA	1.0
12	Zulian et al. (1987)[31]	17/F	Right mandibular ramus	Pain	Mixed nidus	NS	1.0
13	Festa et al. (1992)[32]	50/F	Left mandibular ramus	NA	NA	NA	1.5
14	Yang and Qiu (2001)[33]	24/F	Left articular eminence	Pain, swelling	Central radioopacity with alternating zones of sclerosis and radioluscency	1.2	4.0×3.5
15	Tochihara (2001)[34]	21/F	Left condyle	Pain	Sclerosed nodule	0.8	0.8
16	Ida et al. (2002)[35]	26/F	Left posterior mandible	Pain	Diffuse sclerosis with an ill-defined circular radioopacity	1.0	0.8
17	Liu et al. (2002)[36]	18/M	Mandibular symphysis	Pain, swelling	Mixed Radioluscent/radiopaque lesion	1.5	1.2
18	Badauy et al. (2007)[37]	26/M	Left posterior mandible	Pain, swelling	Central radioopacity surrounded by sclerotic border	NS	1.0
19	Chaudhary and Kulkarni (2007)[38]	43/F	Left posterior mandible	Pain, swelling	Well-defined radioluscency surrounded by corticated border	2.0×2.0 (CT scan)	NS
20	do Egito Vasconcelos et al. (2007)[39]	23/F	Right condyle	Pain, limitation of mouth opening	Dense nidus, surrounding sclerosis	0.8×1.1	NS
21	Manjunatha and Nagarajappa (2009)[40]	43/F	Right angle of mandible	Pain, swelling	Well-defined radiopaque mass	NS	1.0
22	Rahsepar et al. (2009)[41]	21/M	Right subcondyle	Pain, swelling, limitation of mouth opening	Well-defined circular radioluscent lesion	0.6×0.8	NS
23	Karandikar et al. (2011)[42]	14/M	Left angle of mandible	Pain, swelling	Well-defined mixed lesion	3.5×3.5	NS
24	Singh A and Solomon C M (2013)[43]	20/M	Left posterior mandible	Swelling, pain	Well-defined radioopacity with radioluscent border	3.5	3.0

25	An et al. (2013)[44]	10/M	Right posterior mandible	Swelling	Multiple sclerotic masses with radiolucent rims surrounded by diffuse bony sclerosis	0.7×2.0	NS
26	Mohammed et al. (2013)[16]	20/NS	Left body of mandible	Swelling, tenderness	Mixed radiopaque/radioluscent lesion	2.0×3.0	2.0×3.0
27	Khaitan T et al. 2016[10]	40/M	maxilla	Swelling, pain	well-defined radiopaque nidus surrounded by thin radiolucent border in 22, 23 regions	2 x 1	NS
28	Infante-Cossio P et al. 2016[18]	42/ F	right mandible	pain	solitary, oval-shaped, well-defined radio-opaque lesion at the right mandibular ramus, surrounded by a thin radiolucent rim and a diffuse bony sclerosis,	NS	1.0
29	Richardson S et al. 2017[12]	41/F	Right condylar neck	Swelling, pain, conductive hearing loss, restricted mouth opening	Well-defined radiopaque mass with thin radioluscent rim	7.0×6.8×6.4 (CT scan)	7.0×6.5
30	MATTHIES L et al. 2019[19]	18/M	right lower jaw	Pain	unclear tumor mass	NS	0.9×0.8×0.5 cm^3
31	Díaz-Rengifo I A et al. 2019[3]	69/F	upper left maxilla	NS	well-delimited radiopaque mass	NS	4 mm × 8 mm
32	Takashi Maehara et al. 2019[45]	24/F	Right lower jaw	pain and tenderness	oval, internally non-uniform, somewhat obscure boundaries in the right mandible	NS	NS

(M: male, F: female, NS: not specified, NA: data not available, CT: computed tomography)

Referances:

1. Kumar R, et al. Recurrent osteoid osteomas: A case report with imaging features. Journal of Clinical Imaging. 2003;27:269-272.
2. Thopte S, et al. Osteoid Osteoma of the Mandibular Condyle: A Diagnostic Dilemma. Contemp Clin Dent. 2018 Oct-Dec; 9(4): 652–655.
3. Díaz-Rengifo I A et al. Painless osteoid osteoma in the maxilla of an elderly female patient. J Oral Maxillofac Pathol. 2019 May-Aug; 23(2): 280–283.
4. Pikoulas C, et al. Usually Located Osteoid Osteoma. European Journal of Radiology. 1995;20: 120-125.
5. Rajendran R, Sivapathasundharam B. Shafer's Textbook of Oral Pathology. 7th edition. Elsevier publication;941-1038.
6. S.N. Radcliffe et al. osteoid Osteoma: The difficult Diagnosis. European Journal of Radiology.1998;28:67-79
7. Boscainos, Petros & Cousins, Gerard & Kulshreshtha, Rajiv & Oliver, T & Papagelopoulos, Panayiotis. (2013). Osteoid Osteoma. Orthopedics. 36. 792-800. 10.3928/01477447-20130920-10.
8. Golding JS. The natural history of Osteoid osteoma: With a report of twenty cases. J Bone Joint Surg Br 1954;36:218-29.
9. Osarumwense D, Esence C, A Feldman. Bone trephining for osteoid osteoma excision: a case report. Journal of orthopedic Surgery. 2007,15(22):2230-2233.
10. Khaitan T, Ramaswamy P, Ginjupally U, Kabiraj A. A Bizarre Presentation of Osteoid Osteoma of Maxilla. Iranian Journal of Pathology. 2016;11(5):431-434.
11. Chaurasia A, Balan A. Osteoid osteoma of jaws: An overview. Journal of Indian Academy of Oral Medicine and Radiology/January - March 2008/Volume 20/Issue 1.

12. Richardson S et al. A large osteoid osteoma of the mandibular condyle causing conductive hearing loss: a case report and review of literature. J Korean Assoc Oral Maxillofac Surg 2017;43:106-114.
13. An SY, Shin HI, Choi KS, Park JW, Kim YG, Benavides E, et al. Unusual osteoid osteoma of the mandible: report of case and review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol 2013;116:e134-40.
14. Goldberg VM, Jacobs B. Osteoid osteoma of the hip in children. Clin Orthop Relat Res 1975;(106):41-7.
15. Sim FH, Dahlin CD, Beabout JW. Osteoid-osteoma: diagnostic problems. J Bone Joint Surg Am 1975;57:154-9.
16. Mohammed I, Jannan NA, Elrmali A. Osteoid osteoma associated with the teeth: unusual presentation. Int J Oral Maxillofac Surg 2013;42:298-302.
17. Pieterse AS, Vernon-Roberts B, Paterson DC, Cornish BL, Lewis PR. Osteoid osteoma transforming to aggressive (low grade malignant) osteoblastoma: a case report and literature review. Histopathology 1983;7:789-800.
18. Infante-Cossio P et al. Mandibular Osteoid Osteoma. The Journal of Emergency Medicine, Vol. -, No. -, pp. 1–2, 2016
19. MATTHIES L et al. Osteoid Osteoma of the Mandible Clinical and Histological Findings. Anticancer Research 39: 291-296 (2019)
20. Ruston M.A. An osteoid-osteoma of the mandibular alveolus. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1951; 4: 86-88
21. Foss E.L. Dockerty M.B. Good C.A. Osteoid osteoma of the mandible. Cancer. 1955; 8: 592-594
22. Nelson A.R. Osteoid osteoma of maxilla. Arch Surg. 1955; 70: 459-461
23. Stoopack J.C. Sialolith and osteoid osteoma. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1958; 11: 1220-1225
24. Lind P.O. Hillerstrom K. Osteoid-osteoma in the mandibular condyle. Acta Otolaryngol. 1964; 57: 467-474
25. Hillman B.S. Birck H.G. Osteoid osteoma of the maxilla in a 4-year-old patient. Laryngoscope. 1965; 75: 1872-1876
26. Greene Jr, G.W. Natiella J.R. Spring Jr, P.N. Osteoid osteoma of the jaws—report of a case. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1968; 26: 342-351
27. Brynolf I. Osteoid osteoma and fibrous dysplasia in the periapical region of maxillary incisors—report of three cases. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 1969; 28: 243-248
28. Dechaume M. Payen. J Peri G. Ostéoma ostéoïde dela mandibule [Osteoid osteoma of the mandible]. Rev Stomatol Chir Maxillofac. 1968; 69: 215-217
29. Gupta O.P. Jain R.K. Agarwal M.K. Khanna S. Shrivastava A. Osteoid osteoma of the mandible. Ear Nose Throat J. 1985; 64: 206-208
30. Lolli R. Venezia A. Bellardini M. Osteoma osteoide deimascellari. Considerazioni cliniche ed istopatologiche [Osteoid osteomas of the jaws. Clinical and histopathological aspects]. Minerva Stomatol. 1987; 36: 619-625
31. Zulian M.A. Vincent S.K. Hiatt W.R. Osteoid osteoma of the mandibular ramus. J Oral Maxillofac Surg. 1987; 45: 712-714
32. Festa L. Barbieri F. Localizzazione mandibolare dell'osteoma osteoide. Un caso [Osteoid osteoma of mandibular ramus. A case report]. Radiol Med (Torino). 1992; 83: 471-472
33. Yang C. Qiu W.L. Osteoid osteoma of the eminence of the temperomandibular joint. Br J Oral Maxillofac Surg. 2001; 39: 404-406
34. Tochihara S. Sato T. Yamamoto H. Asada K. Ishibashi K. Osteoid osteoma in mandibular condyle. Int J Oral Maxillofac Surg. 2001; 30: 455-457
35. Ida M. Kurabayashi T. Takahashi Y. Takagi M. Sasaki T. Osteoid osteoma in the mandible. Dentomaxillofacial Radiol. 2002; 31: 385-387
36. Liu C.J. Chang K.W. Chang K.M. Cheng C.Y. A variant of osteoid osteoma of the mandible: report of a case. J Oral Maxillofac Surg. 2002; 60: 219-221
37. Badauy C. Carrard V. Rados P. Sant'ana Filho M. Radiopaque mass of the posterior mandible with lingual expansion. J Oral Maxillofac Surg. 2007; 65: 2498-2502
38. Chaudhary M, Kulkarni M. Case report e osteoid osteoma of mandible.JOralMaxillofacPatholJune-December2007;11:52e5.
39. do Egito Vasconcelos B.C. Porto G.G. Bessa-Nogueira R.V. Rare benign tumors of the mandibular condyle: report of 2 cases and literature review. J Oral Maxillofac Surg. 2007; 65: 1830-1835
40. Manjunatha BS, Nagarajappa D. Osteoid osteoma. Indian J Dent Res 2009;20:514e5.
41. Rahsepar B, Nikgoo A, Fatemitabar SA. Osteoid osteoma of subcondylar region: case report and review of the literature. J Oral Maxillofac Surg. 2009;67:888-893.

42. Karandikar S, Thakur G, Tijare M, Shreenivas K, Agrawal K. Osteoid osteoma of mandible. BMJ Case Rep; 2011.
43. Ankur Singh, Monica Charlotte Solomon, Osteoid osteoma of the mandible: A case report with review of the literature, Journal of Dental Sciences, Volume 12, Issue 2, 2017, Pages 185-189.
44. An SY, Shin HI, Choi KS, Park JW, Kim YG, Benavides E, Kim JW, An CH. Unusual osteoid osteoma of the mandible: report of case and review of the literature. Oral Surg Oral Med Oral Pathol Oral Radiol. 2013 Aug;116(2):e134-40.
45. Takashi Maehara, Yuka Murakami, Shintaro Kawano, Yurie Mikami, Tamotsu Kiyoshima, Toru Chikui, Noriko Kakizoe, Ryusuke Munemura, Seiji Nakamura, Osteoid osteoma of mandibular bone: Case report and review of the literature, Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology, Volume 31, Issue 5, 2019, Pages 322-326.

Corresponding Author: Dr. Mohammad Zanul Abedeen
PG Student, Department of Oral and Maxilofacial Pathology, Teerthankar Mahaveeer Dental College and Research Centre, TMU, Moradabad, UP. Phone no: 08171761306
e-mail ID: dr.mohd.zainul@gmail.com

How to cite this article: Abedeen Z A, Nayak T M, Sunitha JD, Dawar G, Malik D, Akbar Z. Osteoid Osteoma of Jaws: A Review. TMU J Dent. 2020;7(3):1-7.