

## Primary Intraosseous Carcinoma and Odontogenic Cyst. Three new cases and review of the Literature

Samir Aboul-hosn Centenero <sup>1</sup>, Antonio Marí Roig <sup>2</sup>, Pedro Piulachs Clapera <sup>2</sup>, Inma Juárez Escalona <sup>1</sup>, Antonio Monner Diéguez <sup>3</sup>, Arturo Díaz Carandell <sup>1</sup>, José Miguel Lluch <sup>1</sup>, Josep Pericot Ayats <sup>4</sup>

(1) Residente de Cirugía Maxilofacial. Hospital Universitari de Bellvitge

(2) Doctor en Medicina y Adjunto de Cirugía Maxilofacial. Hospital Universitari de Bellvitge. Profesores Asociados Universidad de Barcelona

(3) Jefe de Sección de Cirugía Maxilofacial. Hospital Universitari de Bellvitge. Director del Master en Implantología de la Universitat Internacional de Catalunya

(4) Doctor en Medicina. Cirujano Maxilofacial. Práctica privada

### Correspondence:

Dr. Samir Aboul-hosn Centenero

C/ Diputació 345, 2º-1ª

08009, Barcelona

Tlf. 609 518571 / Fax 93 2607982

E-mail: samir74es@yahoo.es; 36002sac@comb.es

Aboul-hosn-Centenero S, Marí-Roig A, Piulachs-Clapera P, Juárez-Escalona I, Monner-Diéguez A, Díaz-Carandell A, Miguel-Lluch J, Pericot-Ayats J. Primary Intraosseous Carcinoma and Odontogenic Cyst. Three new cases and review of the Literature. Med Oral Patol Oral Cir Bucal 2006;11:E61-5.  
© Medicina Oral S. L. C.I.F. B 96689336 - ISSN 1698-6946

Received: 10-12-2004

Accepted: 24-03-2005

[Click here to view the article in Spanish](#)

### Indexed in:

-Index Medicus / MEDLINE / PubMed  
-EMBASE, Excerpta Medica  
-Índice Médico Español  
-IBECS

### ABSTRACT

**Introduction:** The Odontogenic Primary Intraosseous Carcinoma (PIOC) are a rare group of malignant tumours with strict clinic and anatomy pathological diagnosis criteria. The different classification suggested for these tumours and the small amount of cases described in literature makes it hard to know exactly how many of the cases published until now are real.

**Material and methods:** We present three new cases of PIOC originated from a previous cystic lesion that where treated in our Hospital. Two of them in the posterior jaw region where is more frequent, and the third in the upper jaw.

We explain the procedure we used in each case and the aesthetic-functional reconstruction used witches are two fibula osseomiotocutaneous free flaps and a bone graft of iliac crest and further placing of implants. The classification, the clinical and radiological diagnosis, the treatment and its survival are discussed.

**Results:** in all three cases we were able to see in the anatomy pathological study an epithelial, exclusively without surrounding oral mucosa affectation or tissues near the lesion as well as the lack of tumorous pathology in other parts of the body. One of the patients died because of premature massive cervical recidiva while the other two patients are currently free form illness, for ten years one of them and fifteen months the other.

**Conclusions:** the anatomy pathological study of all of the lesions of cystic characteristics at jaw level is very important because of the risk of coexisting with carcinomatous cells. The treatment of these tumours consists in practising aggressive surgery and, in some cases, radio and/or chemotherapy post intervention.

**Key words:** Primary intraosseous carcinoma, odontogenic tumour, jaw cyst.

### RESUMEN

**Introducción:** Los Carcinomas Intraóseos Primarios Odontogénicos (PIOC) son un raro grupo de tumores malignos con unos estrictos criterios diagnósticos clínicos y anatomo-patológicos. Las diferentes clasificaciones sugeridas para estos tumores y el escaso número de casos descritos en la literatura hacen difícil conocer con exactitud cuantos son los casos reales publicados hasta el día de hoy.

**Material y métodos:** presentamos tres nuevos casos de PIOC originados a partir de una lesión quística previa que fueron trata-

dos en nuestro centro. Dos en región posterior mandibular que es el lugar de más frecuente aparición, y un tercero en maxilar superior. Explicamos el tipo de cirugía llevado a cabo en cada caso y la reconstrucción estético-funcional utilizada que son dos injertos osteomiocutáneos de peroné y un injerto de hueso de cresta iliaca con posterior colocación de implantes. Se discute la clasificación, el diagnóstico clínico-radiológico, el tratamiento y su supervivencia.

**Resultados:** en los tres casos se pudo constatar en la anatomía patológica un epitelio celular bien diferenciado acompañando a células carcinomatosas afectando al hueso exclusivamente sin afectación de la mucosa oral circundante ni de tejidos vecinos a la lesión así como ausencia de patología tumoral en otra zona del organismo. Uno de los pacientes falleció por recidiva cervical masiva precoz mientras que los otros dos están libres de enfermedad en la actualidad después de 10 años en uno de ellos y 15 meses en el otro.

**Conclusiones:** es muy importante el análisis anatómico-patológico de todas las lesiones de características quísticas a nivel maxilar por el riesgo de coexistir con células carcinomatosas. El tratamiento de estos tumores debe ser la práctica de una cirugía agresiva y, en algunos casos, asociados a radio y/o quimioterapia post intervención.

**Palabras clave:** Carcinoma intraóseo primario, tumor odontógeno, quiste maxilar.

## INTRODUCTION

The odontogenic tumours create a wide and heterogenic group of tumours that include from benign forms to authentic carcinomas, these tumours are less than 4% of the neoplasia of the bucal and maxillofacial area and within this percentage, not more than 6% are considered malign (1), and in these cases the carcinoma will be predominate over the rest of malignant tumours extracted (2). It has been suggested that the origin to be in remains of epithelial odontogenic tissue (3, 4) (epithelial remains of Malassez) and they have been the subject of numerous taxonomic changes since their first classifications by OMS en 1971 where Pindborg called it Primary Intraosseous Odontogenic Carcinoma(3). This rare entity was described for the first time in 1913 by Loos (5) who defined the tumour as a "Central Maxillary Epidermoid Carcinoma". In the past there have been several authors that have studied the number of cases encountered since its first description and in which stands out the presentation by Eversole and Col. (6) of 36 revised cases. Due to the difficulty of the diagnosis of this rare tumoral entity the number of published cases in literature up to this day and classified as Primary Intraosseous Squamous Carcinoma is not uniform, fluctuating between twenty- four (7) and thirty- nine cases (8).

In the following article we present three clinical cases of Primary Intraosseous Carcinoma that were originated from an Odontogenic Cyst and were collected between 1994 and 2003 at our Hospital Center with the intention of adding more data about this infrequent tumoral pathology and its treatment, and at the same time performing an extensive bibliography revision of what has been published of the tumoural entity up to this day.

## CLINICAL CASE 1

A forty nine year old male patient was sent to us after having an extraction of his third molar included in the right mandible side ((Fig. 1) performed a curettage of a tissue of granulation at apical level and distal of the exodontiated piece. As far as interesting personal history the only outstanding features were a smoking habit of 35 packs/year and 150g/day of alcohol. As far as his family history what stands out is the death of his father

caused by colon cancer. The symptoms of physical exploration were of pain and swelling in the region of the forty eighth piece of several months of evolution that did not improve after the exodontia of such piece and also presenting in the lower right vestibular side a swelling of bone consistency and a strictly normal mucosa .

After analyzing the extracted tissue during the exodontia of the forty-eighth piece by the pathology department is informed as an Squamous cell Carcinoma with well differentiated cells.

A extended clinical and radiological study is performed at head and neck level, where a destructive osteolytic lesion is found in the computerized tomography affecting the body and branch of the jaw and also the right sided multiple cervical lymphadenopathies at all levels, at abdominal-thoracic level no pathological image at distance is evident being normal the blood test and without any alteration of its parameters.

The case is discussed in the Head and Neck Functional Unit ( HNFU) of our center being catalogued as a T2N2bM0 and a radical surgical treatment is decided with a radio therapeutic treatment by isocentric technique of three fields and concomitant chemotherapy.

A hemimandibulectomy is performed from the forty third piece to the right subcondilar region, radical modified cervical neck dissection, tracheostomy and reconstruction with osteomiocutaneous free fibular flap (Fig. 2). The histological study catalogs the piece as a Keratinizing Squamous Cell Carcinoma and affecting twenty three of the thirty-five extracted lymph nodes, with extra capsular invasion of such nodes classifying them as pT2pN2b.

After three and a half months of the surgical intervention a recidive is diagnose after performing a new cervical CT-Scan that showed cervical nodes compatible with massive recidive in the form of multiple bilateral adenopathies. The possibility of performing a new chemotherapy cycle is discussed but it is eliminated due to the fast massive recidive, the lack of response to the treatment and the low level of tolerance to the chemotherapy on the patients side. The patient was accepted to palliative care unit and died six and a half months after the surgical intervention by local-regional massive recidive.



**Fig. 1.** Radiolucent image inside the mandible ramus in the orthopantomography after removal of right third molar.



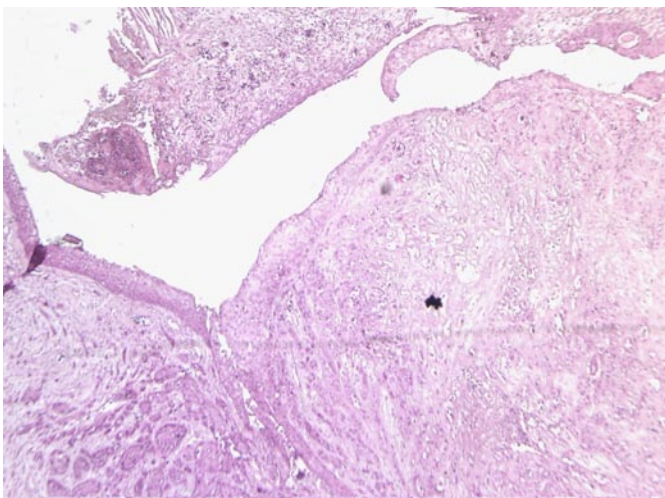
**Fig. 2.** Control Orthopantomography after the operation where we can see the fibula free flap fix with titanium miniplates in the subcondyle and in the anterior mandible region, we also can see the intermaxillar blockage.



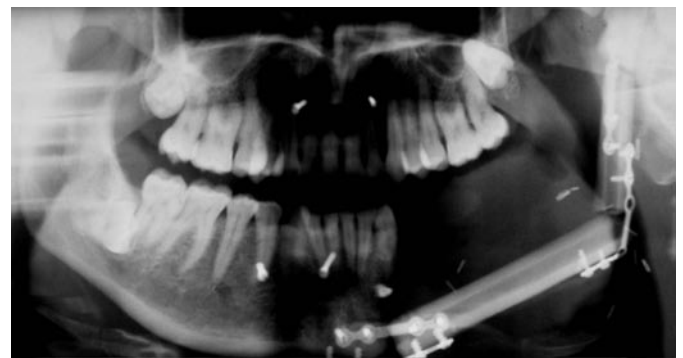
**Fig. 3.** Left third molar in mesial angulation on a radiolucent image in an orthopantomography previous to left third molar removal.



**Fig. 4.** CT-Scan of neoplastic lesion showing the bone marrow infiltration and the hyperinsufflation of the left body mandibular cortical bone.



**Fig. 5.** Anatomy pathological study of the lesion that shows atypical cells with hyperchromatic nucleus with deeply penetrating and well differentiate cells in the surface



**Fig. 6.** Postoperation Orthopantomography that shows the fibula microvascularised free flap osteosynthesis with titanium miniplates in the left subcondyle region and in the left side of anterior mandible region.

## CLINICAL CASE 2

A fifty-one year old female patient without any medical history interest comes to us referred by another hospital center for a exodontia of the thirty eighth piece included in the mesioversion with a suspicious image of a follicular cyst (Fig. 3). At the exploration the patient presents a bone consistency with swelling by vestibular region in the left side of the jaw without affectation of the oral mucosa.

The histological analysis of tissue of granulation extracted with the piece is reported as atypical cells compatible with Squamous Cell Carcinoma with well differentiated cells on the surface (Fig. 5). At cervical level a submandibular lymphadenopathy can be detected on the left side not been specified because of years of evolution without malignant clinical characteristics. A computerized tomography (Fig. 4) that informs of an infiltrative lesion by Positron Emission Tomography that does not evidenciate the presence of cervical nodes or in the rest of the organism suggesting tumoral dissemination.

The case is discussed in the HNFU being decided a surgical treatment and concomitant radiotherapy. The pre-operative tests (blood test, ekg, and chest x-ray) do not show any alteration. A hemimandibulectomy is performed from the thirty fourth piece to the left subcondilar region with a Functional Head and Neck dissection of four cervical nodes levels, tracheostomy and reconstruction with osteomyocutaneous free fibular flap (Fig. 6). The pathology study reports of Squamous Cell Carcinoma with well differentiated cells and no invaded nodes by neoplastic cells of the twenty three nodes extracted being classified as pT2pN0 and chronic inflammatory process at the level of a submandibular lymphadenopathy. In the two check-ups performed up to fifteen months after, the patient is free of sickness.

## CLINICAL CASE 3

An eighteen year old male patient without pathological background of interest comes to us referred by his odontologist after the extraction of the canine of the first quadrant included without any previous symptomatology to the one that was extracted with the piece a follicular cyst that was sent for study to the pathology department which informed of the presence of malign Squamous Cells with Well Differentiated Cells. In the exploration no ulceration of the oral mucosa was present but a fistula was found at the level of vestibular side of the first quadrant that does not drain any material at the moment of exploration. In the orthopantomography an osteolysis image was visible in the anterior region of the first quadrant. In the physical exploration or in the CT scan no cervical lymphadenopathies were present.

The case is discussed in the Oncological Committee of our center where it is decided to practice a maxillectomy from the eleventh piece to the sixteenth and reconstruction with free non vascularized graft of bone from the iliac crest. The patient follows six month check-ups the first five years being free of sickness time in which four implants are placed to position an implant supported prosthetic to this day the patient has been ten years free of tumoral sickness.

## DISCUSSION

No agreement exist as far as the most frequent age and sex of this pathology even though it is believed that the relation man/woman is around a 2/1 and the fifth and sixth decades of life (9) as age slot more frequent for its appearance.

Pindborg and Col. (3) in the reunion at the OMS celebrated in Geneva in 1971, revisioned in 1992 by Kramer and Col.(4) named Primary Intraosseous Carcinoma the tumoral entity that is characteristic for affecting specifically the bone at the moment of diagnosis for which it has to be discarded the possibility of an extension from neighbouring soft tissues, paranasal sinus, metastatic lesions.... According to these classification of the OMS the carcinoma odontogenic go by the following classification:

1. Malignant Ameloblastoma.
2. Primary Intraosseous Carcinoma.
3. Other Carcinomas that originated from the Odontogenic Epithelium also including those originated from a Odontogenic Cyst.

This classification was modified in several occasions, in 1982 by Elzay (10) and afterwards in 1984 by Sloopweg and Muller (11) suggesting the following classification for the odontogenic carcinomas:

1. Primary Intraosseous Carcinoma Ex-Odontogenic Cyst
2. a. Malignant Ameloblastoma.  
b. Ameloblastic Carcinoma: from a Ameloblastoma, a Odontogenic Cyst or de novo.
3. Primary Intraosseous Carcinoma: a) Keratinizing  
b) No Keratinizing

In both classification the primary intraosseous carcinoma appeared de novo without a previous lesion that justifies it, it is discussed even though in the second classification exposed is mentioned as its own entity; this brings the need to demonstrate in the anatomopathologic study the presence of a benign cystic epithelium of Well Differentiated Cells along with Carcinomatous Cells to have a definite diagnosis of Primary Intraosseous Ex-Odontogenic Cyst (8) since clinically it can only be suspected after an exploration generally marked by a tumours fact of inflammatory characteristics without affectation of the oral mucosa and also with radiological images of radiolucid lesion that provokes an osteolysis in the form of an atypic cystic lesion, entering in the differential diagnosis, the ameloblastoma and the Keratocyst among others (7,10).

As far as the cases we presented, the first two are similar in localization but not as far as cervical dissemination, that is because in case number 2 we perform a prophylactic neck dissection of four levels while in the case number 1 the nodes affectation forces us to perform a modified radical neck dissection respecting the spinal nerve, the internal jugular vein and Sternocleidomastoideous muscle. The size of the tumour in the cases 1 and 2 obliged to perform a highly mutilating surgery to preserve the appropriate oncological security margins. The osteomyocutaneous free microvascular graft of fibula allows to reconstruct three-dimensionally the hemimandible after the tumoral exeresis maintaining the functionality and the esthetical profile especially in those cases who are candidates for

the performing hemimandibulectomy. The fact of keeping the mandibular condyle allows the patient to preserve the Temporomandibular Joint which gives a better mobility of the arcade of the rest of the jaw and the placed graft and also diminishes the risk of post operative pain and in the mid and long run at the level of such articulation. It is also important to value the possibility of performing an intermaxilar block such as in case number 1 and 2 during one or two weeks looking for the best occlusal relation possible.

The anatomic place where you most frequently find this malignant tumour is the mandibular inferoposterior region (8) which can be seen in the x-ray image as a uni o multilocular radiolucid lesion in the majority of cases even though it can also be seen as a combination of radiolucid zones and radiopaques in the x-ray images (7,10). The symptomatology of pain and mild inflammation, together with mobility of dental pieces can last long periods of time before the diagnosis can be suspected or to put us on the track of this tumoral entity after seeing an x-ray image compatible with a cystic lesion in relation with an included third inferior molar; the delay in performing a correct diagnosis will influence negatively in the prognostic.

In case number 3 what stands out is the rare location of the tumour and its precautions diagnosis allows to perform the exeresis where the tumoral process was still of small diameters so that it was sufficient the practice of a maxilectomy to achieve the appropriate security margin. The fact of being a small size tumour in the upper maxillae without clinical cervical affectation or radiological allowed to discard the necessity of performing a surgical treatment at cervical nodes level. Three years after the surgical intervention, being the patient free of sickness, the placement of an implant supported prosthetic is performed improving the functional and esthetical results of the previous surgical intervention.

For some authors (12) the Primary Intraosseous Carcinoma originated from an odontogenic cyst is of worse prognostic that the other authors believe the total country affirming that these tumours of better prognostic when they originate from a pre existing lesion (13). Any how all parts agree that the aggressive surgical treatment is the best therapeutic option (9,12) from the moment of diagnosis, by itself or in combination with radiotherapy and or chemotherapy (14,15).

## CONCLUSIONS

We consider of great importance to perform an anatomopathologic study of all the lesions with cystic appearance or characteristics founded by chance or after the extraction of a dental piece because of the possibility that Carcinomatous Cells may exist.

The chosen treatment, as long as a surgery with curatives finalities can be practiced, is the relation of a exeresis with wide oncological security margins (not less than 1 cm) associating a radiotherapeutic treatment and or chemotherapeutic in function of the anatomy-pathological definite study, and a reconstructive surgery that will allow to obtain some acceptable functional and esthetical results being the osteomyocutaneous microvascularized free fibula flap a good reconstructive option because of

its length and low mortality for the cases that affect mandibular posterior region.

## REFERENCES

1. Regezi JA, Kerr DA, Courtney RM. Odontogenic tumours; analysis of 706 cases. *J Oral Surg* 1978;36:771-8.
2. Eversole LR. Malignant epithelial odontogenic tumours. *Semin Diagn Pathol* 1999;16:317-24.
3. Pindborg JJ, Kramer IRH, Torloni H, eds. Histological typing of odontogenic tumours, jaw cysts and allied lesions. Geneva:Health; 1972. p. 35-6.
4. Kramer IR, Pindborg JJ, Shear M. The World Health Organisation histological typing of odontogenic tumours. A commentary on the second edition. *Cancer* 1992;70:2988-94.
5. Morrison R, Deeley TJ. Intra-alveolar carcinoma of the jaw. Treatment by supervoltage radiotherapy. *Br J Radiol* 1964;35:321-6.
6. Eversole LR, Sabes WR, Lovin S. Aggressive growth and neoplastic potential of odontogenic cysts. *Cancer* 1975;35:270-82.
7. Kaffe I, Ardekian L, Peled M, Machtey E, Laufer D. Radiological features of primary intra-osseous carcinoma of the jaws. Analysis of the literature and report of a new case. *Dentomaxillofacial Radiology* 1998;27:209-14.
8. Sueti Y, Tanimoto K, Taguchi A, Wada T. Primary intraosseous carcinoma: review of the literature and diagnostic criteria. *J Oral Maxillofac Surg* 1994;52:580-3.
9. Waldrom CA, Mustoe TA. Primary intraosseous carcinoma of the mandible with a possible origin in an odontogenic cyst. *Oral Surg* 1989;67:716-24.
10. Elzay RP. Primary intraosseous carcinoma of the jaws. *Oral Med Oral Pathol* 1982;54:299-303.
11. Sloomweg PJ, Muller H. Malignant ameloblastoma or ameloblastic carcinoma. *Oral Surg* 1984;57:168-76.
12. El-Mofty SK, Shannon MT, Mustoe TA. Lymph node metastasis in spindle cell carcinoma arising in odontogenic cyst. Report of a case. *Oral Surg Oral Med Oral Pathol* 1991;71:209-13.
13. Murillo-Cortes J, Etayo-Perez A, Sebastian-Lopez C, Martino-Gorbea R, Rodriguez-Cortel JM. Primary intraosseous carcinoma arising in a mandibular cyst. *Med Oral* 2002;7:370-4.
14. Thomas G, Pandey M, Mathew A, Abraham EK, Francis A, Somanthan T et al. Primary intraosseous carcinoma of the jaw: pooled analysis of world literature and report of two new cases. *Int J Oral Maxillofac Surg* 2001;30:349-55.
15. Mosqueda Taylor A, Meneses Garcia A, Ruiz Godoy Ribera LM, Suarez Roa Mde L, Luna Ortiz K. Malignant odontogenic Tumors. A retrospective and collaborative study of seven cases. *Med Oral* 2003;8:110-21.

*Aknowledgments:* Thanks to Marcella Frediani Hayes for their work to Translate this article.