

## Classification of Odontogenic Tumours. A Review of the Past

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### ABSTRACT:

In 1869, Broca proposed a categorization of odontogenic tumours (OTs), using the term odontome to refer to any tumour originating from the dental formative tissues. While preserving Broca's odontome idea, Bland-Sutton and Gabell, James and Payne updated tumour terminology between 1888 and 1914. In their categorization of 1946, Thoma and Goldman eliminated the term "odontome" and classified OTs as tumours of ectodermal, mesodermal, or mixed origin. The hypothesis that reciprocal epithelial-mesenchymal tissue interactions also played a role in the aetiology of OTs served as the foundation for Pindborg and Clausen's categorization (1958). A Collaborating Center for the Histological Classification of Odontogenic Tumours and Allied Lesions (including Jaw Cysts) was created by WHO in 1966 under the direction of Dr. Jens Pindborg. A second edition of the official WHO guidance for classifying OTs and cysts was published in 1992 after the first edition was published in 1971. The WHO Blue Book series' editors decided to publish a volume on head and neck tumours in 2003 that included a chapter on odontogenic tumours and bone-related lesions. In 2002, Philipsen and Reichart revised the 1992 edition. IARC, Lyon published this book in July 2005.

**Keywords:** classification; odontogenic tumours.

## INTRODUCTION:

Odontogenic tumours (OTs) are lesions of significant interest and significance to oral pathologists and maxillofacial surgeons, who have spent decades researching, cataloguing, and developing effective treatment options for these lesions. However, OTs have only recently gained significant and continuously growing interest, in fact, since the first version of the WHO classification (Histological Typing of Odontogenic Tumours, Jaw Cysts, and Allied Lesions) was released in 1971 (1). The diagnostic framework and vocabulary were made available with the first edition, and this contemporary and logically formed classification significantly spurred study on the topic and stoked the desire to publish fresh findings.

### Definition of 'tumour'

There are various definitions on what is meant by the phrase "odontogenic tumour." The term "tumour" has been used by the writers in the context of this fullest sense and not just to tumours that are unquestionably cancerous. Even by this broad definition, only 2-3% of all oral and maxillofacial specimens sent to oral pathology facilities for diagnosis are OTs, indicating that they are not frequently occurring lesions (2). If this number is calculated as a percentage of all tumours in the human body, a conservative estimate of between 0.002 and 0.003% is produced (3).

### Preliminary OT reports

In the oldest dental journal account of an OT, a 7 cm big bony-hard lesion of a maxillary bicuspid was described. In modern language, this lesion would be classified as a cementoblastoma. The American Journal of Dental Science (AJDS), which first appeared in 1839 (5), featured this specific instance as one of numerous initiatives during the early years of the Golden Age of Dentistry (1835–1860). (6). The American Medical Association only recognised this journal as a valid medical journal, and it served as the official publication of the first American Dental Association. Approximately half of all scientific articles in the first volume of AJDS, according to Bouquot and Lense (6), dealt with pathological disorders of the mouth and jaws. A complicated odontoma that erupted with the underlying tooth was described in AJDS in 1848 (7). It was extremely unique in that way. Midway through the 1850s, the first definitive cases of compound odontomas were described (8, 9). The first accurate description of an odontoma, unquestionably the earliest odontogenic lesion on record, was made in 1746 (10) by renowned French dentist and the father of modern dentistry Pierre Fauchard. A curious odontoma found in a 500 000-year-old British petrified horse was described by Richard Owen in 1846 (11). Owen may be best known for writing dental histology textbooks, where his name is closely linked to the so-called incremental or contour

lines (Owen lines), which may be easily seen under a microscope in ground sections of dentine.

### **Broca, 1869**

The number of publications on OTs significantly rose in the middle of the 19th century. These studies were not only published in American dentistry and medical journals, but also to a substantial extent in European scientific journals from France, the United Kingdom, Germany, Italy, and Scandinavia. The moment appeared right for the initial attempts to begin classifying OTs given the rising number and variety of reported instances. A monograph (12), written in 1869 by the French physician and professor of pathology and clinical surgery Pierre Paul Broca, included a classification of OTs as one of the possible tumour types (Figs. 1–2). He suggested classifying the lesions according to the stage of tooth formation at which abnormal growth started by using the term "odontome" for any tumour developing from the dental formative tissues. However, it is clear that outside of France, Broca's classification did not receive much support or attention. His thorough research was not, in fact, at all concerned with oral pathology. He is regarded as the father of modern brain surgery, and his primary contributions to science can be found in the areas of anatomy, general pathology, neurology, ethnology, physiology, and anthropology. This outstanding polyhistor and researcher transitioned to politics in his later years and was elected as a life member of the French Senate.

### **Malassez, 1885**

Another Frenchman, Louis Charles Malassez, who was well-known to oral histologists and oral pathologists, proposed modest changes to Broca's categorization in 1885 (13), but unlike Malassez's epithelial rests, these changes had little international impact.

### **1888 Bland-Sutton**

Bland-1888 Sutton's addition to OT classification was of greater long-term importance (14). He did, in fact, lay the groundwork for what might be considered contemporary. The cover of Paul Broca's second book of *Traité des Tumeurs*, published in 1869. Broca's classification of odontogenic tumours (also known as "odontomes"), which can be found on page 300 of the second volume. Odontogenic tumour classification Philipsen and Reichart 526 J Oral Pathol Med OT-taxonomy by basing his classification on the characteristics of the specific tooth germ cells from which the tumour originated. Odontogenic cysts and fibrous osteogenic tumours were included in Bland-categorization, Sutton's although the name "odontome" or "odontoma" remained the standard term for any tumour of odontogenic origin.

### **James, Payne, and Gabell, 1914**

The British Dental Association asked Gabell, James, and Payne to write a paper on odontomes as the beginning of the year 1914 (15). These authors expanded upon and made

additional modifications to Bland-categorisation. Sutton's Again, all OTs were referred to be odontomes. Three major odontome groupings were identified by their classification: I Neoplasms known as multilocular cysts and nonneoplastic cysts were seen in the epithelial odontomes. (ii) The composite odontomes included lesions in which aberrant tissues originated from both the epithelium and the mesenchyme and took the appearance of either recognised tooth-like features or irregular calcified masses. And last (iii), connective tissue odontomes, a class of tumours made up of fibrous and other connective tissue that were previously believed to solely develop from dental mesenchyme.

### **Terminology change related to tumours**

This vocabulary was gradually replaced in the years that followed by one that was more appropriate for general pathological use, with the different lesions being so named as to correspond as closely as possible to the parent cell type. Thus, the multilocular cyst became the adamantinoma or adamantoblastoma, words that were in widespread use for a long time before Ivy and Churchill proposed the currently popular ameloblastoma in 1930. Depending on their shape, the connective tissue odontomes developed into fibromas or cementomas. However, the composite lesions, which included both epithelial and mesenchymal components, kept their original name of odontomes or odontomas.

### **Thoma and Goldman, 1946**

American Academy of Oral Pathology, 1952. The odontogenic cysts introduced by BlandSutton in 1888 were once more removed from the categorization by Thoma and Goldman published in 1946 (16), but the enamel cysts were included. Pearls, also known as enamelomas, were once thought of as tumours because they were developmental abnormalities rather than neoplasms. The American Academy of Oral Pathology adopted the Thoma and Goldman classification in 1952 with very minimal adjustments, and it was widely used and accepted in many textbooks, particularly American oral pathology texts. The word "odontoma" has currently been constrained to exclusively refer to lesions that contain both mesenchymal and epithelial components.

### **1958's Pindborg and Clausen**

When discussing the pathogenesis of OTs in the 1950s, a novel idea gained popularity and generated a lot of discussion. The central question was: Is it likely that the 'inductive effect', a phenomenon widely acknowledged to exist and have a significant impact on normal odontogenesis, also operates in OT pathogenesis? This reciprocal epithelial-mesenchymal interaction, according to Pindborg and Clausen (1958) (17), may very well explain at least some of the cellular alterations observed during tumour aetiology. Based on this, the authors proposed a hotly contested but largely well-received classification. Epithelial and mesodermal tumours were separated into two major categories. The epithelial tumours were further divided into two groups based on the ability of the epithelium to instigate changes in

the surrounding mesenchymal tissue: (A) consisting of pure epithelial tumours with no inductive changes in the connective tissue, such as ameloblastoma and calcifying epithelial odontogenic tumour [CEOT, described in detail and named in 1958 by Pindborg (18) and since commonly known as the Pindborg Epithelial tumours that exhibit inductive alterations in the mesenchyme make up the second category (B). These tumours included ameloblastic fibromas (or sarcomas), which affect soft tissue, and dentinomas and odontomas, which affect hard dental tissue. The final group of mesodermal tumours included cementifying fibroma, odontogenic myxoma, and odontogenic fibroma (and fibrosarcoma). The Pindborg and Clausen classification, which Gorlin et al. significantly amended in 1961 (19), was at the time considered to be a significant advancement and was a key component of the WHO publication *Histological Typing of Odontogenic Tumours* (1). The WHO project, 1958 as we go down the winding route of OT classifications, the WHO made a significant decision in 1958. In a resolution adopted by the WHO Executive Board, the Director-General was asked to investigate the possibility of setting up an International Reference Centre, a number of Collaborating Laboratories around the globe, and arrangements for the collection of human tissues and their histological grading. These centres' primary goals would be to create histological descriptions of various tumour forms and to encourage widespread adoption of a standardised nomenclature with the obvious goal of enhancing communication among cancer specialists.

### **1966–1969 WHO Collaborating Center**

First edition, 1971, of the WHO *Histological Typing of Odontogenic Tumours, Jaw Cysts, and Allied Lesions* Professor Jens Pindborg founded the WHO Collaborating Centre for the Histological Classification of OTs and Related Lesions in 1966 at the Department of Oral Pathology, The Royal Dental College in Copenhagen, Denmark. Professors Ivor Kramer of the University of London and Jens Pindborg participated in a meeting in Geneva, Switzerland that same year where it was decided that jaw cysts should be included in the categorization. A worldwide panel of top oral and general pathologists assessed all of the histological preparations from the cases analysed during the ensuing years. Finally, the categorization was approved in 1969. Pindborg and Kramer's comprehensive and practical guide to the classification of OTs, cysts, and related lesions was released by WHO two years later, in 1971. (1). It was emphasised in the prologue that the book was not meant to be used as a textbook, which is why no literature references were given. Second edition of WHO's 1992 *Histological Typing of Odontogenic Tumours* A second edition with the title *Histological Typing of Odontogenic Tumours* was published in 1992, 21 years later (20). It also included neoplasms and other lesions connected to bone in addition to epithelial cysts. In this updated version, professor Mervyn Shear joined professors Kramer and Pindborg, the writers of the first edition, as a third author. The original edition's fundamental structure virtually remained the same. However, a few newly discovered tumours were also added, like the squamous OT and clear cell OT, to name a couple. WHO classification revision for the 1992 edition



(Philipsen and Reichart, 2002). The writers of the current article met in the beginning of 2002 to consider whether it was appropriate to recommend a revision and updating of the second edition of the WHO classification. The meeting led to a publication later that year (21). During the preceding decade, significant progress was achieved in our understanding of the origins and interactions of the odontogenic tissues in tumour growth, in large part due to the quick development of immunohistochemistry and molecular biology approaches. The possibility of a revision was further strengthened by numerous reports of previously unidentified tumour types and variations. WHO Tumor Classification, 2000–2005 The WHO Classification of Tumours book series was launched by the International Agency for Research on Cancer (IARC) in Lyon, France, in 2000. Both histopathological and genomic criteria for tumour classification are included in the new WHO Blue Books. Paul Kleihues of Lyon and Leslie Sobin of Washington are the series editors. (2000), the Digestive System (2000), Haematopoietic and Lymphoid Tissues (2001), Soft Tissues and Bone (2002), Breast and Female Genital Organs (2003), Urinary System and Male Genital Organ (2004), Lung, Pleura, Thymus and Heart (2004), Endocrine Organs (2004), Head and Neck Tumours [July 2005, (4)] and Skin Tumours (December 2005) were all covered in the Head and neck tumours: pathology and genetics, 2005. The editors invited several oral and general pathologists to take part in the volume on Head and Neck Tumours, specifically chapter 6: Odontogenic Tumours and Bone Related Lesions. These pathologists served as a working group for editing the contributors' manuscripts and attending the final Editorial and Consensus Conference in. They included P.A. Reichart (responsible editor), H.P. Philipsen, P.J. Slootweg, and J.J. Sciubba.

## CONCLUSION:

There is nothing to suggest that the language and categorization of OTs have been settled, despite the fact that pathologists worldwide now have access to a new, completely revised, and expanded WHO classification. The new Blue Book is expected to serve as a source of inspiration and heighten interest in ongoing research on OTs and related diseases.

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