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RESEARCH ARTICLE

JUXTAORAL ORGAN OF CHIEVITZ (JOOC)

***,[1]Dr. Sushma Bommanavar, [2]Dr. N. D. Shashikiran, [1]Dr. Rajendra Baad, [1]Dr. Nupura Vibhute [1]Dr. Vidya Kadashetti, [1]Dr. Uzma Belgaumi and [3]Dr. Sushma R. Bhandary**

[1]Department of Oral Pathology & Microbiology, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, India
[2]Department of Pedodontics and Preventive Dentistry, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, India
[3]Department of Prosthodontics, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, India

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ABSTRACT

The Juxtaoral Organ of Chievitz is a normal anatomical structure located within the soft tissue in the buccotemporal fascia on the medial surface of the ascending ramus. It is considered of neuroepithelial origin with no known function. This structure is not unique for only adults but is also been reported in some other species. As a matter of fact, JOOC is one of the most treacherous pitfalls in surgical pathology with respect to lesions in the head and neck area. Hence the basic aim of this review is to reveal the importance about this organ and enlighten the oral pathologist about this histopathological structure, thus preventing extensive and unnecessary investigations.

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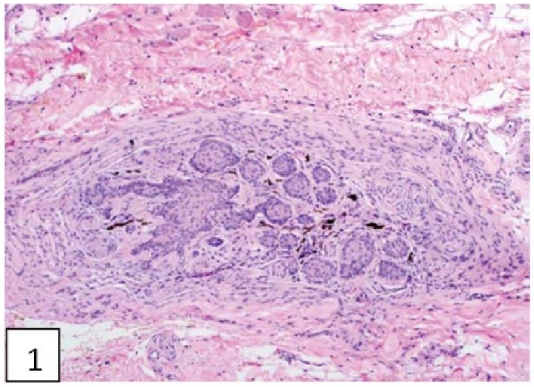
INTRODUCTION

The Juxtaoral Organ of Chievitz abbreviated as JOOC is a normal anatomical structure located within the soft tissue (Daifullah Al Aboud *et al*., 2014) in the buccotemporal fascia on the medial surface of the ascending ramus. (Mills *et al*., 2000) It is considered of neuroepithelial origin with no known function (Daifullah Al Aboud *et al*., 2014) although it has been considered to be mechanosensor of oral functions as in speech and swallowing. (Ide *et al*., 2003) JH Chievitz, a Danish anatomist first described JOOC in 1885 while studying human embryos. (Chievitz, 1885) However this structure is not unique for only adults but is also been reported in some other species and in reptiles as well. (Pierre Soucy *et al*., 1990; Zenker *et al*., 1953) This enigmatic vestigial (Chievitz, 1885) structure is been designated with various other names depending on its embryologic origin as orbital inclusions, buccopharyngeal tract, buccotemporal organ and juxtaoral organ. (Michal *et al*., 2012) The only practical importance of awareness of this stucture lies in the potential of been misdiagnosed as perineural invasion in a patient with oral squamous cell carcinoma. (Pantanowitz *et al*., 2003) As a matter of fact, JOOC is one of the most treacherous pitfalls in surgical pathology with respect to lesions in the head and neck area. (Michal *et al*., 2012) Hence the basic aim of this review is to reveal the importance about this organ and enlighten the oral pathologist about this histopathological structure, thus preventing extensive and unnecessary investigations. (Ide *et al*., 2003) Originally thought to be of embryonic origin, JOOC starts as an epithelial thickening of the stomodeum and invaginates into the subjacent mesenchyme. This epithelial bud then detaches from the oral epithelium and becomes innervated by a buccal nerve branch receiving vascular supply from the buccal artery. (Mérida-Velasco *et al*., 2005) The juxtaoral organ of Chievitz measures between 7 and 15 mm in length and between 1 and 2 mm in diameter. If it is more than 10 mm in diameter then clinicians

Corresponding author: Dr. Sushma Bommanavar
Department of Oral Pathology & Microbiology, School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, Maharashtra, India.

are likely to suspect submucosal tumor or hyperplasia of JOOC. (Kusafuka *et al*., 2007) Microscopically, epithelial parenchyma embedded in a highly organized connective tissue stroma rich in nerves is evident as illustrate is Fig. 1 & 2 (Daifullah Al Aboud *et al*., 2014; Bénateau *et al*., 2003; Müller *et al*., 1981)



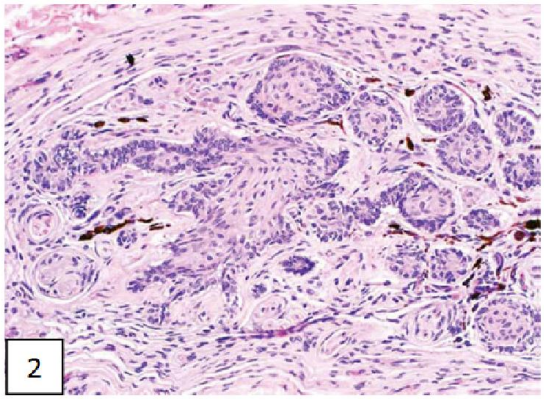


Figure 1 & 2. The Juxtaoral organ of Chievitz is composed of nests of epithelial parenchyma embedded in highly organized connective tissue stroma rich in nerve bundles (*Courtesy:* Jerad M Gardner, MD, University of Arkansas for Medical Sciences, USA ; Daifullah Al Aboud et al., 2014)

The epithelial component consists of circumscribed nests of non-keratinizing squamous, columnar and occasionally, basaloid epithelial cells with a definite glandular or organoid pattern with no keratin formation. (Chievitz, 1885) Three concentric domains of connective tissue encase the epithelial islands. The inner layer called stratum fibrosum internum consists of dense collagen fibers that are separated from the epithelial islands by a distinct basal lamina. (Müller and Zenker, 1981; Pantanowitz and Balogh, 2002) The middle layer, stratum nervosum, is characterized by loose connective tissue stroma, populated with myelinated and nonmyelinated fibers. (Müller and Zenker, 1981; Tschen and Fechner, 1979) The outer layer, the stratum fibrosum externum, connects to the muscle fascia of the buccotemporalis. (Pantanowitz and Balogh, 2002) The basement membrane around these epithelial islands demonstrate PAS positivity. (Chievitz, 1885) Histochemically, wide spectrum CKs have been found to react with the epithelial nests of JOOC. (Vadmal *et al*., 1998; Hultenschmidt *et al*., 1991; Mandl *et al*., 1993) The squamoid epithelium shows high alkaline phosphatase activity and is immunohistochemically positive for CK19 which is a marker for JOOC. (Daifullah Al Aboud *et al*., 2014) Mandl *et al.* (1993) reported CK19 immunoreactivity in the central squamous cells (Ide *et al*., 2003; Kusafuka *et al*., 2007; Mandl *et al*., 1993; Ide *et al*., 2003) We also found positive staining for CK10 and CK14 in the epithelial cells. The available CK profiles to date suggest that the epithelial nests of JOOC share the immunohistochemical phenotype of non-keratinised stratified squamous cells. Alkaline phosphatase activity of the epithelial component of the JOOC and a possible mechanoceptor function due to close approximation of JOOC to structures resembling Pacinian corpuscles have also been documented. (Müller and Zenker, 1981; Ide *et al*., 2004) JOOC is an innocuous variation of normal anatomy and carries no risk for malignant transformation and no recurrence after its removal (Pantanowitz and Balogh, 2002; Ide *et al*., 2003; Soucy *et al*., 1990)

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