



# Juxtaoral Organ of Chievitz and the Scientist Behind It

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## ABSTRACT

The juxtaoral organ of Chievitz (JOOC) is a normal permanent anatomical structure located within the soft tissue overlying the angle of the mandible in the buccotemporal space. It is considered of neuroepithelial origin with no known function. In children, the normal organ may be discovered as a small mass in the cheeks, which may lead to extensive and unnecessary investigations. Chievitz first described JOOC in 1885 while studying human embryos. The aim of this review is to draw attention to the clinical importance of this organ and to provide a concise biography on the scientist who first described it.

**Keywords:** Eponym, Juxtaoral organ of Chievitz, Oral pathology, Tumor.

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## INTRODUCTION

The juxtaoral organ of Chievitz (JOOC) is a histopathological structure encountered in oral pathology. The aim of this manuscript is to shed some light on this organ and the scientist who first described it.

## JUXTAORAL ORGAN OF CHIEVITZ

The juxtaoral organ of Chievitz is a normal permanent anatomical structure located within the soft tissue overlying the angle of the mandible in the buccotemporal space.<sup>1-9</sup> It was first described by, JH Chievitz, a Danish anatomist in 1885. He described epithelial nests without ductal structures, which were related to the buccal nerve, developing and disappearing during the embryonal period.<sup>10</sup> Originally, thought to exist during embryogenesis. However, in 1953, Zenker proved that it can be found in adult humans.<sup>9</sup> It is also seen in many other mammals and in reptiles.

It is typically seen between the temporal and buccinator muscle near the pterygomandibular raphe. Various names have been given to this structure, including orbital inclusions, buccopharyngeal tract, buccotemporal organ and juxtaoral organ, reflecting diverse theories regarding its embryologic origin.<sup>8</sup>

Although JOOC is considered a mechanosensor of oral functions including speech and swallowing, its exact function is not yet known.<sup>6</sup> It is composed of an epithelial parenchyma embedded in a highly organized connective tissue stroma rich in nerves (Figs 1A and B). Histochemically, squamoid epithelium shows high alkaline phosphatase activity and is immunohistochemically positive for CK19, which is a marker for JOOC. 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 are likely to suspect submucosal tumor or hyperplasia of JOOC.<sup>7</sup>

In children, the normal organ may be discovered as a small mass in the cheeks, which may lead to extensive and unnecessary investigations.<sup>3,5</sup> However, surgical removal of this juxtaoral structure is not needed. Hyperplasia of the parenchyma may occur, but carcinoma originating from this organ has not been reported.<sup>5</sup>

Awareness of this normal anatomic structure is important, because the finding of epithelial islands intimately admixed with nerves could be misinterpreted as perineural invasion by carcinoma.<sup>5</sup> 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.<sup>8</sup> When the oral squamous cell carcinoma is diagnosed on frozen section, JOOC is a pitfall for diagnosis, especially regarding the buccal and pterygoid regions. Mistaken JOOC for a squamous cell carcinoma may lead to unnecessary devastating operations.

The juxtaoral organ of Chievitz may cause suspicion of invasion of carcinoma even on radiological examination or it may rarely form a tumoriform mass.<sup>8</sup> A case with melanin pigmentation has been described. The presence of melanocytes coupled with the close proximity of the squamous epithelial nests to Schwann cells led the authors to speculate neural crest influence on the development of JOC.<sup>6</sup>

## JOHAN HENRIK CHIEVITZ (1851-1901)

Johan Henrik Chievitz (1851-1901) (Fig. 2), was a Danish anatomist. He was born on 16 October 1850, in Svendborg which is a town on the island of Funen in south central Denmark.

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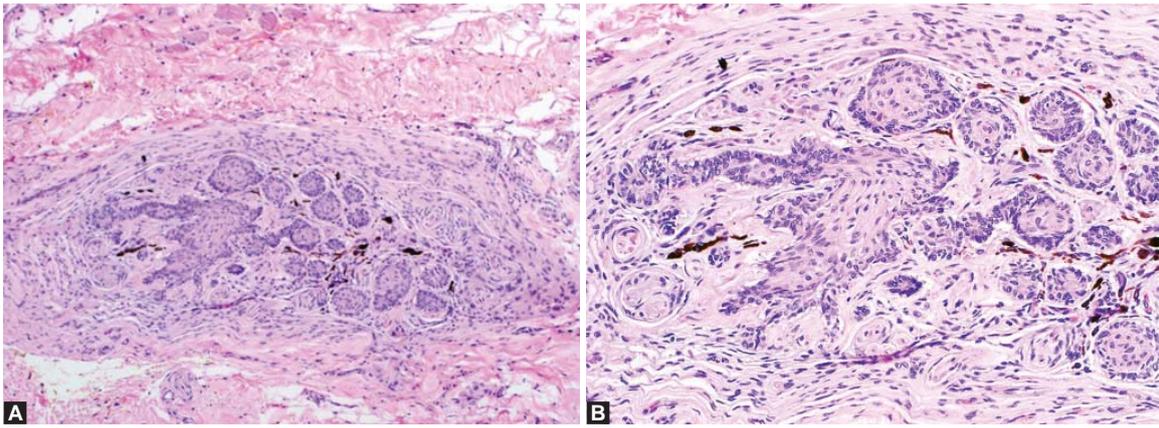
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**Figs 1A and B:** The juxtaoral organ of Chievitz is composed of nests of benign squamoid epithelium closely associated with multiple nerve bundles (Courtesy: Jerad M Gardner, MD, University of Arkansas for Medical Sciences, USA)

There are no publications on Professor Chievitz, in the English language, literature and all the information listed here are based on reference number.<sup>11</sup>

Chievitz graduated in 1869 from Sorø, which is a town in region Sjælland on the island of Zealand (Sjælland) in east Denmark. He got his medical degree in 1875. He practiced a short time before he was employed in 1877, in the anatomy under Professor Theodor Schmidt (1825-1880). In 1881, he won the university's gold medal for a thesis on ossification. After Professor Schmidt's death, he was given leave to study further in Leipzig, in Germany. When he returned to Copenhagen, he took classes in anatomy and was appointed in 1881 as associate professor in the anatomy. In 1888, he became professor of anatomy.

Professor Chievitz's health was not strong, and as a result of infection which he may get from his work he contracted pulmonary tuberculosis and later the laryngeal tuberculosis which greatly reduced his activities. Despite an improvement after a long stay in Switzerland and Italy, between 1893 and 1894, he was never completely healthy, his zeal diminished.

Professor Chievitz's scientific works are not numerous, but highly worthwhile, distinguished by reliability and thoroughness. In teaching, he continued the best traditions

of the Danish school represented by his two immediate predecessors Professor Theodor Schmidt (1825-1880) and Professor IB Pedersen Ibsen (1801-1862). He made a great scientific contribution, in particular to salivary glands and retina development. In addition, he wrote an excellent textbook on fetal development (1891, 2nd ed. 1898).

JOOC is named for him after his description in 1885. He noted it in 10-week-old embryos during his study on the development of salivary glands.<sup>10</sup>

Professor Chievitz died in Copenhagen on 6 October 1901.

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**Fig. 2:** Johan Henrik Chievitz (1851-1901) (Courtesy: The Royal Library, Denmark)