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Benign paroxysmal positional vertigo (BPPV): it may occur after dental implantology. A mini topical review

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Abstract. – OBJECTIVE: Benign Paroxysmal Positional Vertigo (BPPV) is one of the most frequent vestibular disorders. BPPV as a complication of Osteotome Sinus Floor Elevation (OSFE) is a complication that rarely occurs.

The aim of this paper is to better understand the mechanisms underlying the BPPV after SFE with the osteotomes. This could be important for all the dental and maxillofacial surgeons that should know and manage this clinical occurrence.

DISCUSSION: The osteotome sinus floor elevation (OSFE), firstly described by Summers requires the use of a surgical mallet for striking the bone, until the optimal depth is reached.

The surgical mallet develops a mechanical trauma, even if the striking is performed with a gentle percussion. The recent literature describes an average occurrence of OSFE-induced BPPV quite low, but the symptoms show to be unpleasant and severe, often able to alter the patient's daily life.

CONCLUSIONS: A successful remission of BPPV following treatment with a particle repositioning maneuver will be necessary and relatively urgent for the surgeons who have experienced this clinical complication.

The surgeons, therefore, must be aware of these complications and about the ways to manage them.

Key Words:

Osteotome sinus floor elevation, Benign paroxysmal positional vertigo, BPPV, Implantology.

Introduction

Benign Paroxysmal Positional Vertigo (BPPV) is among the most reported disorders of vestibular tract, with a prevalence estimated on 10 cases per 100,000 inhabitants[1]. The BPPV is particularly frequent between 50 and 55 years in the idiopathic cases, while it is quite rare in childhood[2].

The degeneration of statoconia is one of the major causes of this disorder, and the older age seems to predispose the demineralization of these components of internal ear, as shown by several studies[3].

The first to describe BPPV was Busch[4], while other authors[5] called this clinical condition with other names, such as cupulolithiasis. Previous studies[6,7] suggested a etiopathogenesis starting from the deposit of particles in the posterior semicircular canal, and these particles would be floating: this phenomenon is called canalithiasis. Vertigo is triggered during head movements due to the presence of these statoconia in the semicircular canals, able to activate the nerve endings, thus activating BPPV.

The BPPV commonly starts from the posterior canal which is typically involved more than other semicircular canal[8,9] (Figure 1).

Head injury has been identified as the most common noxa associated to BPPV development, moreover vestibular neuritis and ear surgery complications can be included among the most frequent causes, even if the literature has reported also idiopathic cases[10].

The clinicians must pay attention to the position of nystagmus. In fact, the diagnosis of BPPV has to be only considered in the presence of nystagmus, and its positioning can, of course, aid to identify the localization of the side of the damaged canal.

Dix and Hallpike[11] have reported about their maneuver for the diagnosis of posterior and anterior semicircular canal BPPV. Literature[12-15] has clearly indicated not to perform examinations as well as invasive tests in those patients clinically

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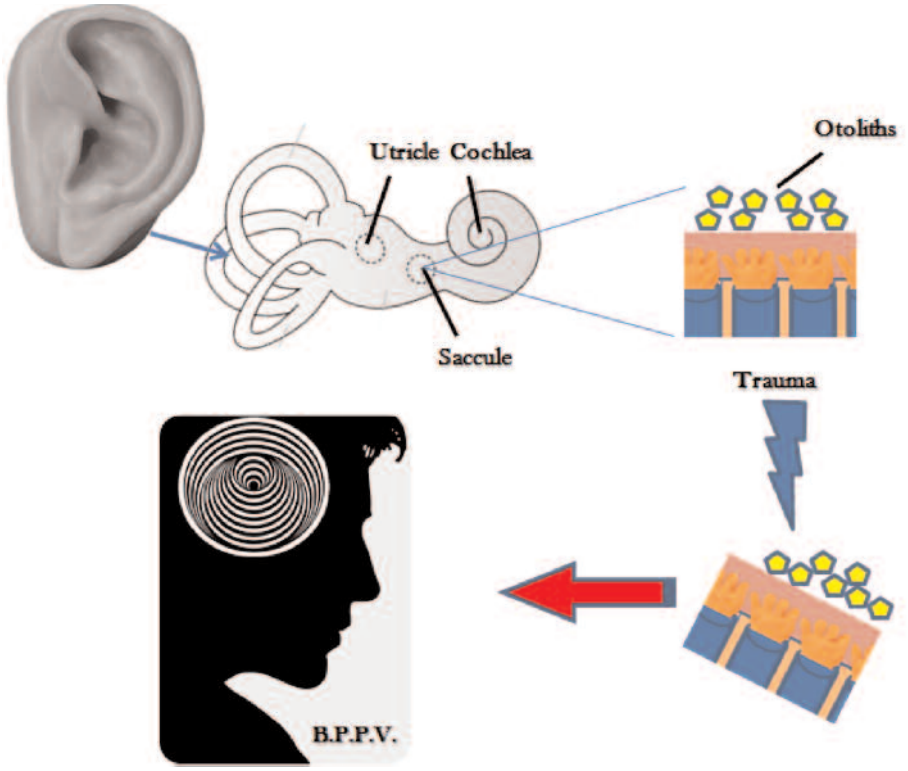

Figure 1. Mechanisms of benign paroxysmal positional vertigo.

diagnosed with BPPV, in the light of the easiness and reliability of clinical diagnosis.

The clinical cases described[6,9] show forms of vertigo caused by atypical movements such as: laying down or fast head movements, even without nystagmus.

BPPV as a Complication of Osteotome Sinus Floor Elevation (OSFE)

The osteotome sinus floor elevation (OSFE), firstly described by Summers[19], is the elective surgical procedure performed if the maxillary sinus has a mild to moderate resorption: immediate implant placement is the most frequently performed rehabilitative technique[20]. OSFE requires the use of a surgical mallet for striking the bone, until the optimal depth is reached.

The surgical mallet develops a mechanical trauma, even if the strikes are performed with a gentle percussion. Moreover, the preparation of surgical site for dental implants, as well as the same implant insertion in the maxillary bone just after the OSFE, along with the hyperextension of the neck toward the operation, can cause a displacement of the otoliths; these surgical activities can contribute to develop the presence of BPPV[21].

Recently, it has been described[22] an average incidence of OSFE-induced BPPV quite low, an interesting study has reported that it is less than 3% with a quick spontaneous recovery. The symptoms are unpleasant[23] and severe, often able to alter the patient's daily life.

Tatum[24] was the first to report the sinus lift technique with crestal approach; the crestal approach requires a specific set of osteotomes and a surgical mallet: the tunneling of the maxillary crest with burs and osteotomes as well as the surgical mallet beats are able to transmit different intensity of percussive forces capable of detaching the otoliths from the otoconia layer of the utricular macula[23-25]. On the other hand, even the positioning of the patient face up and his head in hyperextension could be a contributing cause for the displacement of otoliths into the posterior semicircular canal, thus causing vertigo[25].

After performing a crestal sinus lift technique, whenever the patient should complain of a verti-

go sensation, the diagnosis of BPPV can be established by inducing a rapid change from the sitting position to the left or right head-hanging position: this procedure is called the Dix-Hallpike test[26]. Typically, BPPV manifests itself after few seconds after the patient has been undergone to Dix-Hallpike test[27], often associated with a characteristic nystagmus: however, both disappear in a maximum of 60. Only patients who developed vertigo and nystagmus with this maneuver have a real BPPV: if nystagmus is not present the clinician should investigate on other possible diagnosis[11].

Pharmacological and Medical Treatment of BPPV

Typically, BPPV has an early incoming and it is a self-limiting disorder; nonetheless it is a clinical condition which drastically reduces the patient's compliance to the implant surgery. When BPPV complicates the OSFE procedure, surgeons have to rapidly treat this pathological condition by means of a combined therapy aimed to treat the different causes of BPPV. Benzodiazepines, such as diazepam and clonazepam, and antihistamines, such as meclizine and diphenhydramine, are the drugs most commonly used to reduce the spinning sensation of vertigo and the nausea and vomiting associated with motion sickness. Motion sickness medications are sometimes helpful in controlling the nausea, but are generally not very beneficial[15,25].

Apart from the pharmacological approach, BPPV can be approached with medical maneuvers able to reposition the otoliths: the Epley maneuver is commonly used in posterior semicircular canal BPPV cases, with an effectiveness reported in about 80% of patients[28]. This maneuver get to move the canaliths towards the vestibule: this head movement, thus, dislocates the particles into the vestibule where they dissolve themselves[28-30] resolving effectively and definitively the symptomatology of BPPV induced by OSFE[31].

The Epley maneuver and other different techniques described in the literature[32], take advantage from the mechanical movements and from the gravity to treat BPPV making the particles starting from the posterior canal[32,33] until reaching the vestibule[34-36].

Other maneuvers[37-39], such as the Semont technique, use the gravity force to evacuate the particles from the posterior canal.

When these techniques, even if self-performed, are correctly carried out, patients will experience an extremely rapid spontaneous remission of the symptoms within 7 days from the BPPV symptoms onset[40,41].

Conclusions

BPPV experienced after maxillofacial or implant surgery decreases the patient's quality of life and also reduces the patient's compliance with the surgeon[42] in the following dental implant insertion or surgical regenerative[43] procedures. In this light, a successful remission of BPPV following treatment with a particle repositioning maneuver[41] will be necessary and relatively urgent for the surgeons who have experienced this clinical complication.

To avoid those cases of BPPV as a complication of osteotome sinus floor elevation, oral surgeons should manage the OSFE maneuvers in order to reduce the possibility to induce BPPV. The safe and gentle hammering is the most important rule. The bone wall removal should be performed with gentle movements and with a safe head position. Before the surgery, when OSFE has to be performed, patients should be informed about the possibility of postoperative vestibular symptoms: an interdisciplinary approach including the surgeon, dentist and otolaryngologist is strongly advised in these cases. Finally, a clear take-home informative communication about the BPPV and about the self-executable maneuvers should be left to the patient immediately after the first visit and after having performed the OSFE. The surgeons, therefore, must be aware of these complications and about the ways to manage them.

Conflict of Interest

The Authors declare that they have no conflict of interests.

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