

**FIGURE 2.** Use of abelangs on the author is photographed herein. The advantage of using modified abelangs can be seen on the author as dominating the base of the mouth.

Description of references in Figure 2:

1. Handle
2. Body
3. Fly
4. Notch (notch angle)
5. Body angle

The invention is made of PVC, plastic, wood or composite material compatible with human tissues. The device comprises a handle, body, tip, notch (notch angle), and in some embodiments, a body. The invention is used by hand from the back. For this purpose, surgical use is made of sterile disposable or re-sterilized.

### THE APPLICATION OF THE INVENTION TO THE INDUSTRY

This model, which is more effective than the language presses used in the routine examination, will not make any difference regarding cost. Also, it allows the use of technology such as radiofrequency, cautery surgery, ablation surgery, thermal welding, while providing language retraction in tongue bond operations.

Advantages:

- 1) Prevents the front of the image from being closed during surgery due to the angle provided.
- 2) During the examination and surgery with normal tongue pressure, patient braking can not be controlled because the process becomes difficult. It prevents the patient from playing the base of the mouth by pressing the brake device between the device (Figs. 1 and 2). With this advantage, the duration of examination and surgery is reduced in patients with cooperative difficulties and in children.
- 3) The sterile material can be used in surgery.

- 4) Material is not metal, allows the patient to intervene surgery without cautery burn.

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## Diagnosis of Bilateral Calcifications of Temporomandibular Joint Disc by Image Fusion

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**Abstract:** The calcification of the articular disc is an uncommon lesion, usually discovered in hips, elbows, and shoulders, but rarely in temporomandibular joints (TMJ). The TMJ disc calcification may be related to pain and limitation of the mandibular mobility, however, most of the patients were asymptomatic. A 61-year-old female was referred to our hospital after a maxillofacial fist injury, bilateral TMJ disc calcifications were found accidentally by radiological examination. Here the significance of image fusion of cone-beam computed tomography and magnetic resonance imaging (MRI) in the diagnosis of this lesion was emphasized.

**Key Words:** Calcification, image fusion, radiological examination, temporomandibular joint disc

The calcification of the articular disc is an uncommon lesion, rarely described in temporomandibular joints (TMJ).<sup>1</sup> It usually involves elderly people, with no gender differentiation according to

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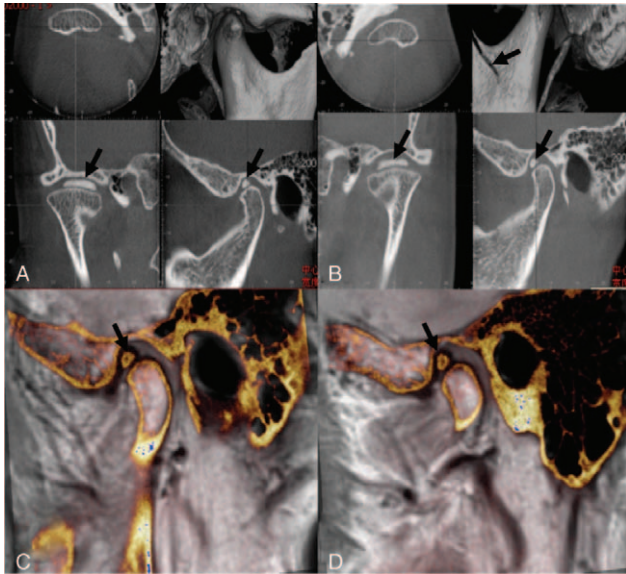
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**FIGURE 1.** The CBCT images demonstrate hair line fracture in left sigmoid notch, and high-density calcified mass (Solid arrows) with clear boundary in the space of bilateral joints (1A, right; 1B, left.). Merging images with CBCT and MRI verified the calcified mass (Solid arrows) in the posterior portion of bilateral discs. The discs are in normal shape (1C, right; 1D, left.). CBCT, cone-beam computed tomography; MRI, magnetic resonance imaging.

the literature.<sup>2</sup> It is not easy to discover this lesion as most of the patients are asymptomatic. Here we reported a 61-year-old female with bilateral TMJ disc calcification and emphasized the significance of image fusion of cone-beam computed tomography (CBCT) and magnetic resonance imaging (MRI) in the diagnosis of this lesion.

### CLINICAL REPORT

A 61-year-old female was referred to our hospital 19 days after a maxillofacial fist injury, complaining pain in her left TMJ region. The maximum mouth-opening was 32 mm, with mandible deviation to left. Protrusion and lateral movements of the mandible were limited. Obvious tenderness was found around the left TMJ and the medium masseter region. The CBCT showed a small well-defined calcified mass in each joint space, which is streak in coronal position and oval in sagittal position, respectively. There's also an incomplete hairline fracture in the left sigmoid notch (Fig. 1A, 1B). The MRI demonstrated low signal intensity of the interior of both articular discs, while discs remained biconcave. The calcified mass was confirmed located in the posterior zone of both discs after merging CBCT and MRI images by using Amira visual software (version 5.4.3, Visage Imaging, Melbourne, Australia), with no adhesion to surrounding tissue (Fig. 1C, 1D).

The diagnosis included hairline fracture of left ramus and calcifications of bilateral TMJ discs. She was given non-steroidal anti-inflammatory drugs with related health education. 8 months after injury, the active mouth-opening of this patient was up to 55 mm with pain and swelling relieved.

### DISCUSSION

The calcification of the articular disc is an uncommon lesion which has been described rarely in previous literature. It was regarded as a kind of disc remodeling due to aging or functional adjustment,<sup>3</sup> with or without other articular degeneration. The etiology and the mechanism of disc calcification remain unknown.

Image fusion technology may exhibit advantages compared to conventional radiological examinations. Calcification of TMJ disc is featured by radiopacities in joint space with fine, smooth boundary on CBCT images. However, it should be distinguished with loose bodies from osteoarthritis or synovial chondromatosis. MRI can evaluate the relative tissue when disc calcification occurs, the morphology of TMJ disc can keep in normal shape and position, but its demarcation line with the calcified lesion is not clear.

Merging of CBCT and MRI images can provide more specific information about the location of the articular disc calcification and the detection of TMJ anatomical structures. Calcified area of the articular disc often located in the medium and posterior zone of the disc, having clear boundary with neighboring tissue, which was supported by previous study on cadavers.<sup>2</sup>

In conclusion, it is not easy to diagnose TMJ disc calcification because most of the patients are asymptomatic. Hence, image fusion technology of CBCT and MRI in the diagnosis of this lesion is proposed.

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## Removal of Foreign Bodies in Orbit-Zygomatic-Maxillary Complex

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**Abstract:** Trauma is one of the leading causes of death worldwide. Due to its anatomy and position in the facial skeleton, the orbit becomes a region susceptible to trauma which may also involve the penetration of foreign bodies (FBs). These events can have serious repercussions depending on their extent due to the proximity of the orbit with other noble structures of the face and skull. Because of this, a system of prehospital management of traumas must be

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