Japanese Dental Science Review (2014) **50**, 86—90

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Review Article

Multidetector computed tomography of maxillofacial fractures

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Received 5 August 2013; received in revised form 16 May 2014; accepted 30 May 2014

KEYWORDS
Computed tomography;
Mandibular fractures;
Midfacial fractures

Summary Fracture morphology of maxillofacial trauma is often complex, so the clinicians should be familiar with the imaging findings. Various radiographic methods have been used for diagnosing maxillofacial trauma. In recent years, multidetector computed tomography (MDCT) with multiplanar reformation (MPR) and three-dimensional (3D) images has become a standard part of the assessment of maxillofacial injury because of the exquisite sensitivity of this imaging technique for fracture. In this review, we will summarize the maxillofacial fractures using MDCT, especially mandibular fractures and midfacial fractures including maxillary fractures. We will also discuss the temporal bone fractures associated with mandibular trauma and the radiation dose of MDCT. Maxillofacial bones support functions such as breathing, smelling, seeing, speaking, and eating. Therefore, maxillofacial fractures require accurate radiologic diagnosis using MDCT and surgical management to prevent severe functional debilities and cosmetic deformity.

Contents

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http://dx.doi.org/10.1016/j.jdsr.2014.05.002
1882-7616

1. Introduction

Fracture morphology of maxillofacial trauma is often complex, so the clinicians should be familiar with the imaging findings. Various radiographic methods have been used for diagnosing maxillofacial trauma. Panoramic tomography is widely used for the screening of orofacial trauma as well as other diseases [1]. Cone-beam computed tomography (CBCT) is also used for diagnosing orofacial diseases [2]. However, despite a higher radiation dosage compared to radiography, in craniomaxillofacial injuries, CT is the imaging technique of choice to display the multiplicity of fragments, the rotation and dislocation degree, or any skull base involvement [3].

Multidetector computed tomography (MDCT) allows high-quality multiplanar reformation (MPR) and isotropic viewing; all of which improve the diagnostic power of this imaging modality, thus benefiting maxillofacial trauma patients, and can detect the non-displaced fractures and also provide valuable three-dimensional (3D) morphology of the more complex injuries in maxillofacial trauma [4—6]. In recent years, MDCT with MPR and 3D images has become a standard part of the assessment of facial injury because of the exquisite sensitivity of this imaging technique for fracture [7—9].

In this review, we will summarize the maxillofacial fractures using MDCT, especially mandibular fractures and midfacial fractures including maxillary fractures. We will also discuss the temporal bone fractures associated with mandibular trauma and the radiation dose of MDCT.

2. Mandibular fractures

CT was more sensitive than panoramic tomography, particularly for fractures of the angle, ramus, or condyle [10]. Condylar fractures have been detected in 64.8% of all patients with mandibular fractures using MDCT [11]. For other studies, 48.0% of patients with mandibular fractures had condylar fractures using radiographic examination [12], and condylar fractures accounted for 50.1% of the mandibular fractures using panoramic radiography

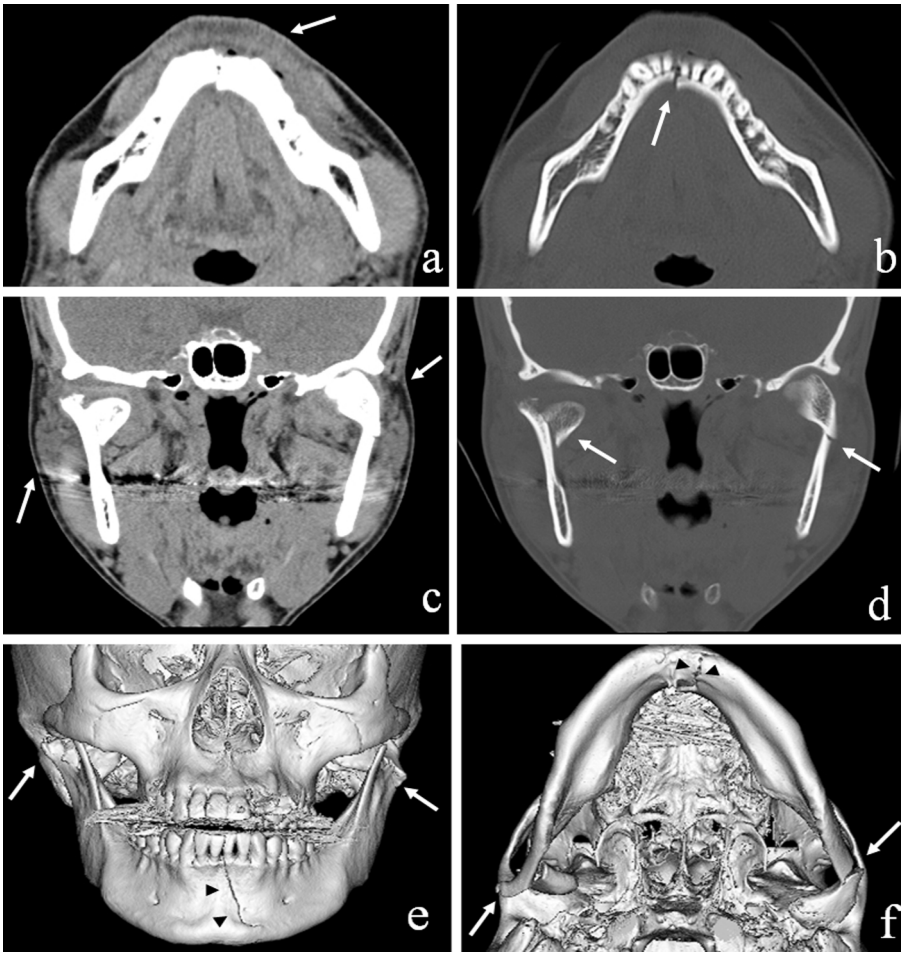

Figure 1 A 46-year-old male with mandibular fracture resulting from falls. Axial image (a) demonstrates a median fracture with soft tissue edema (arrow). Axial image (b) demonstrates a median fracture (arrow). Coronal image (c) demonstrates condylar fractures with soft tissue edema (arrows). Coronal image (d) demonstrates condylar fractures (arrows). 3D images (e and f) to better advantage show median (arrowheads) and condylar fractures (arrows).