1. Introduction

Magnetic resonance imaging (MRI) has an increasing role as a diagnostic imaging modality in Australia. In 2015, there were 41 MRI scans performed per 1000 population [1]. Although MRI technology currently has limited uses in dentistry, such as evaluation of temporomandibular joint anatomy, dental patients are increasingly exposed to MRI for medical indications. There are a number of reasons why MRI technology is becoming more frequently utilised internationally, including increased accessibility, the absence of ionizing radiation, and superior soft tissue resolution compared to other imaging modalities [2].

Dental materials have important implications on the use of MRI as a diagnostic imaging modality. A case of a dislodged crown while in an MRI machine prompted a review of the literature for the implications and considerations of dental materials with magnetic resonance technology. An understanding of the basic physics involved in magnetic resonance is required to appreciate the relevance of dental materials in an MRI scanner. This case report supported by a literature review recommends assessing a patient’s crown retention prior to and after MRI scanning.
A magnetic vector along the axis of the MRI scanner is conventionally used to align protons in a uniform magnetic field, which then becomes resonant. This resonant energy is detected by the MRI machine and converted into images. The magnetic field can have a strong effect, potentially leading to artefacts and distortions in MRI images if certain materials are present.

### 3. Discussion

The temporal relationship between the crown dislodging and the commencement of the MRI mechanism is clear. Allowing for the delay between the occurrence of the dislodged crown and the commencement of the MRI mechanism, the patient had the dislodged crown replaced before the MRI scan. This suggests that the dislodgement was coincidental, or that the MRI machine had an inherent flaw that led to the dislodgement. Further investigation is recommended to determine the cause of the dislodgement and to prevent similar occurrences in the future.

**Table 1: Dental materials and impact on MR image artefact**

<table>
<thead>
<tr>
<th>Material</th>
<th>Compatible</th>
<th>Noncompatible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stainless steel</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Titanium</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Zirconia</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Porcelain</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Ceramic</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Composite</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Resin</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>Gutta percha</td>
<td>I</td>
<td>C</td>
</tr>
</tbody>
</table>

**Notes:**
- **I** = images are retained, no image artefacts.
- **C** = images are distorted, with severe image artefacts.

### References

MRI scanning and the potential mechanisms of this. In terms of displacement and heating, the literature is limited to ex vivo studies of dental materials and appliances placed in MRI scanners. These studies have found limited risk of dental materials causing damaging heating or significant displacement in the magnetic field. This case report, however, supports the Chockattu et al. recommendation of assessing a patient’s crown retention prior to and after MRI scanning.

Data Availability

Data may be accessed on request from the corresponding author, Dr. Brenton Wilson.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

References