



# The assessment of osseous changes in the temporomandibular joint using Cone Beam Computed Tomography.

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## ABSTRACT

### Introduction

Clicking of the temporomandibular joint (TMJ) is not a normal occurrence. The clinical finding of chronic clicking of the joint can signify osseous changes and early signs of degenerative joint diseases.

### Aim

To compare osseous changes seen in the mandibular condyles of patients presenting at the Oral Health Centre, Tygerberg Campus, with and without clicking of the temporomandibular joint.

### Methods

From amongst patients routinely attending the Oral Health Centre, a sample of 25 were selected as presenting with asymptomatic clicking of the temporomandibular joints. A matched sample of patients who did not demonstrate clicking was collected as a control. The mandibular condyles of both groups (N=100) were examined for erosions, flattening, lipping, sclerosis and osteophyte formation.

### Results

The prevalence of sclerosis of the right joint in the study group was statistically significantly higher in comparison with the control group ( $P = 0.002$ ). Age and gender showed no statistical significance between the two groups.

### Conclusion

Osseous changes were found in both the control and study groups but were more consistently found amongst those having asymptomatic clicks of the temporomandibular joints.

## INTRODUCTION

There is a misconception amongst patients and practitioners that clicking of the temporomandibular joint (TMJ) on opening and/

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## ACRONYMS

TMJ: Temporomandibular Joint

TMD: Temporomandibular Joint Disorders

CBCT: Cone Beam Computed Tomography

## KEY WORDS

Cone Beam Computer Tomography, TMJ, TMD, Clicking, degenerative joint disease

or closing does not warrant treatment unless there is associated pain. A click is however a clinical manifestation of disorders of the TMJ known as internal derangement – which relate to abnormal positional relationships between the mandibular condyle, the articular eminence and the articular disc that separates them. The important consideration is that chronic derangement of the joint frequently results in osteoarthritis.<sup>1</sup>

A click can present at almost any stage during normal motion and function of the TMJ and can vary in audibility and severity.<sup>2</sup> The associated derangement can displace the articular disc in anterior, posterior, medial or lateral directions. When the displaced disc returns to its proper position, force may be exerted on the osseous structures of the TMJ resulting in compensatory or abnormal response.<sup>3</sup> There is a possibility that a disorder of the TMJ, which is a chronic process, can result in disease progression if left untreated. The importance of diagnosing the early stages of derangement and treating the signs and symptoms could prevent or reduce the chances of degenerative joint diseases like osteoarthritis.<sup>4</sup>

The presence of erosions, sclerosis lipping, osteophyte formation and flattening of the condyle are indicative of an active degenerative procedure and their recognition is possibly diagnostic of the risk of future disease.<sup>1,4</sup>

## MATERIALS AND METHODS

The study group comprised 25 patients (50 joints) who presented for routine dental treatment and, on examination, had demonstrated asymptomatic clicking of the TMJ. These patients consented to CBCT examination and were then referred to the TMJ clinic. The control group comprised 25 patients (50 joints) whose records were drawn from the files and who had been evaluated for treatment other than for temporomandibular joint disorders (TMD). The control group was contacted telephonically

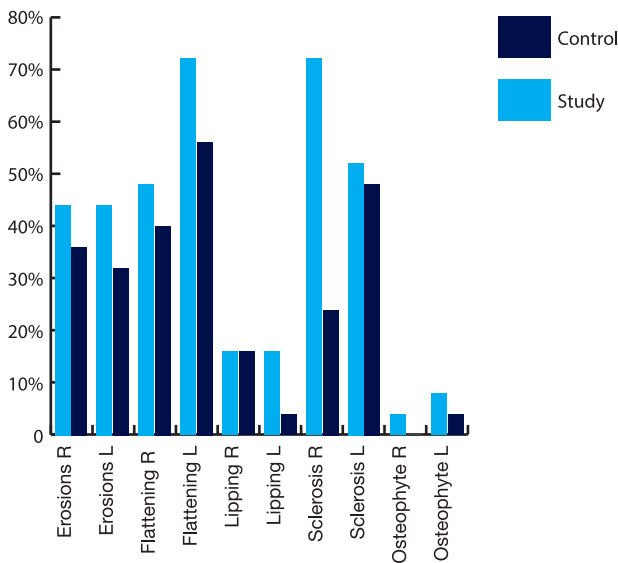
to confirm they presented no symptoms and were made aware of their records being used anonymously. Study group patients were exposed to low dose, high resolution cone beam computed tomography using a Newtom® VGI CBCT machine. Similar radiographs were available in the files of the patients in the control group. Three dimensional reconstructions of the condyles were made to allow full examination of the shapes of both the right and left condyles. Hence, 100 joints were examined. Osseous changes of the condyles that were recorded included: erosions, flattening, lipping, sclerosis and osteophyte formation. The patient's gender and age were recorded to allow for correlation with the findings. P-values were obtained using Chi-squared test applied to a cross tabulation for each variable by group.

**RESULTS**

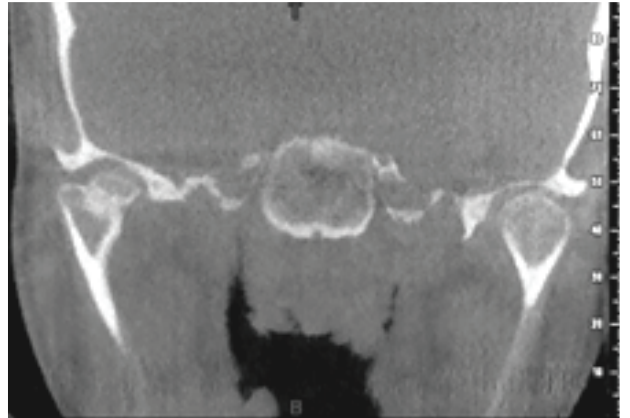
The mean age for the control group was 35.04 years and for the study group, 30.64 years. Neither age nor gender demonstrated any statistically significant significances in analysis. The relative prevalence of each of the variables examined are presented in Table 1, and graphically in Figure 1. In every instance except lipping, which showed equal findings for the right condyles, the study group recorded higher figures. However statistically significant differences were demonstrated only in the variable of sclerosis affecting the right condyles ( $p= 0.002$ ).

**Table 1:** Prevalence (%) of the various osseous changes observed in study and control groups

Osseous change	Study	Control
Erosions R	44%	36%
Erosions L	44%	32%
Flattening R	48%	40%
Flattening L	72%	56%
Lipping R	16%	16%
Lipping L	16%	4%
Sclerosis R	72%	24%
Sclerosis L	52%	48%
Osteophyte R	4%	0%
Osteophyte L	8%	4%



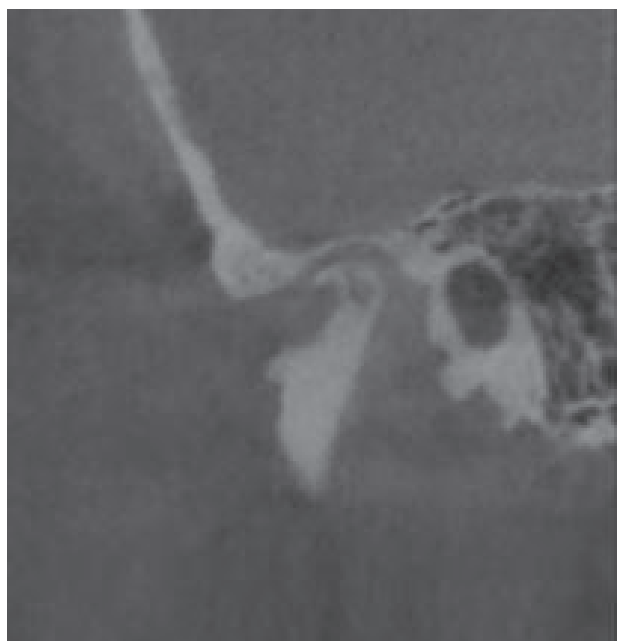
**Figure 1:** Relative prevalences (%) of the various osseous changes observed in study versus control groups



**Figure 2:** Axially corrected coronal CBCT view of right and left condyles. The right condyle shows subchondral sclerosis and deviation in form with osteophyte appearance, sclerosis and flattening of the eminence, with mild erosion seen on the left condyle. Patient had an asymptomatic click of the joints.



**Figure 3:** Axially corrected coronal CBCT view of left condyle showing erosions, subchondral sclerosis and shape deformity. Mild erosion of the eminence is also present.



**Figure 4:** Sagittal view showing lipping, erosion and sclerosis of condyle and eminence.

## DISCUSSION

Osseous changes were observed in both the study and the control groups. In general, the study group demonstrated more evident changes with erosions (44%-32%), flattening (72%-40%) and sclerosis (72%-24%) being the more common findings. Lipping was relatively uncommon (16%-4%) and osteophyte formation (8-0%) was the least frequently occurring change seen. These data confirm previous notions that normal physiological wear of the joint may result in some osseous changes of the condyles in middle to older age group patients having asymptomatic joints.<sup>5</sup> Some of these may be associated with osteoarthritis such as erosions, lipping subchondral cyst and osteophyte formation (Figures 2,3,4). Erosion of the condyle is the earliest manifestation of degenerative changes.

## CONCLUSION

Osseous changes of the condyles were found in both the study and control groups. Almost every characteristic, except lipping, showed a higher prevalence amongst the study group. A prolonged clicking of the TMJ warrants a clinical examination and an adequate radiographic examination preferably with CBCT, if available.

### References

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