



# Possible link between extraction of wisdom teeth and temporomandibular disc displacement with reduction: matched case control study

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## KEYWORDS

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**Summary** We undertook a case control study that compared 220 patients diagnosed with disc displacement with reduction at the Dental Hospital of Manchester with 1100 controls drawn from participants in the 1998 Adult Dental Health Survey. We found that patients were not significantly more likely to have had extraction of third molars than controls; odds ratio: 1.28, 95% CI: 0.96–1.71. Also only 21 patients (9.5%) reported having had extraction of third molars in the 5 years before their diagnosis. We conclude that for most patients extraction of third molars is unlikely to have caused disc displacement with reduction.

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## Introduction

Disc displacement with reduction is diagnosed in 30%–40% of patients attending the temporomandibular disorder (TMD) clinic at the University of Manchester Dental School. It occurs when the disc of the temporomandibular joint is displaced anteriorly or medially or when the bones of the joint become deranged. It commonly causes pain, clicking of the joint, and restriction of movement. It has been suggested that trauma during extraction of a third molar may have a role in the onset of this condition.<sup>1</sup> If a link were found it would be impor-

tant because extraction of third molars is common. We undertook a case control study to estimate if patients diagnosed with disc displacement with reduction were more likely to have had their third molars extracted than controls. We also report for patients with clinically diagnosed disc displacement with reduction the interval from the extraction of their third molars to the diagnosis of their condition.

## Patients and methods

Cases were selected from patients with a diagnosis of disc displacement with reduction who attended the TMD clinic at the University of Manch-

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ester Dental School. It is a tertiary referral centre that receives referrals from general practitioners and general dental practitioners throughout Greater Manchester and Cheshire. The diagnostic criterion used for disc displacement with reduction was a consistent click during the opening or closing of the mouth, or both. Patients with a subluxation were excluded. Imaging was not used to confirm the diagnosis as there is good correlation between the diagnosis made by an experienced clinician by history taking and physical examination, and that made after arthrograms.<sup>2</sup> Controls were selected from subjects who participated in the 1998 UK Adult Dental Health Survey.<sup>3</sup>

The size of the study was based on detecting a difference in the proportion of cases and controls who had had their third molars removed. A study with 228 cases and 5 controls for each case would have greater than 80% power to detect if 38% of controls and 48% of cases had their third molars removed at the 0.05 significance level. The power calculation was informed by the results of a pilot study. Patients with disc displacement with reduction were identified by a manual search of the clinical records of patients attending the TMD clinic. The records were extracted as a continuous series from the patients' appointment dates going backwards from November 2002 until sufficient eligible patients were identified. Patients aged less than 18 years were excluded from the study. Each eligible patient was sent a letter explaining the study and a short questionnaire asking if they had had their third molars removed and how long ago, in years, this had been done. They were also sent an information sheet explaining which teeth were third molars. To allow comparison with the controls no distinction was made between third molars extracted from the upper or the lower jaw. Patients who did not respond to this first questionnaire within 3 weeks were sent a reminder questionnaire. It was assumed that 75% of patients with disc displacement with reduction would respond to the questionnaires, to ensure adequate power the clinical records were searched until more than 304 eligible patients with disc displacement with reduction were identified. The patients who responded to either round of the questionnaire were included in the case control analysis as cases. Controls were selected from all subjects who answered either yes or no to the question in the 1998 Adult Dental health Survey, which asked if they had ever had wisdom teeth removed. For each case five controls of the same age and sex were selected at random from the pool of possible controls. For women aged 19 there were insufficient controls of that age and the controls for these cases were selected from women

aged 18, 19, or 20. Matching for sex and age was undertaken because extraction of wisdom teeth is more common in women and the likelihood of ever having had an extraction increases with age. An odds ratio comparing the proportion of cases and controls reporting having ever had or having never had their wisdom teeth removed was calculated and 95% CI were constructed around this odds ratio using Woolf's method.<sup>4</sup>

## Results

The casenotes of 910 patients who had attended the TMD clinic were reviewed and 336 patients were identified with the diagnosis of disc displacement with reduction. Of these patients, 23 were under 18 years of age and were not included in the study. The remaining 313 patients were sent the questionnaire. The age of the patients ranged from 18 to 83 and 260 (83%) were women.

In the first round 177 people (58%) responded to 304 questionnaires delivered (nine questionnaires were returned unopened by the postal service) and in the second round 45 people (33%) responded to 138 questionnaires delivered. This made a total of 222 patients who responded, two patients were excluded, one because they did not wish to participate, and one who did not complete the questionnaire, therefore, 220 patients were included in the case control study of which 37 (17%) were men and 183 (83%) were women. The response rate was higher in older patients; 61 patients (58%) under 30 responded, compared with 113 (75%) aged between 30 and 50, and 46 (81%) aged over 50 years. Of the 220 patients 99 (45%) reported having had a wisdom tooth removed. [Table 1](#) shows the results by sex for the first and second rounds of questionnaires.

In the 1998 Adult Dental Health Survey 5820 (86%) of the subjects knew whether they had had a wisdom tooth removed. From these 1100 controls were chosen; 185 were men and 915 were women. In total 429 controls (39%) reported that they had had a wisdom tooth removed at some time during their lives. Of the male controls 61 (33%) and of the female controls 368 (40%) reported that they had had a wisdom tooth removed at some time during their lives. The odds ratio between the cases and controls for reporting ever having had a wisdom tooth removed was 1.28 (95% CI: 0.96–1.71).

Of the 99 patients who reported having had a wisdom tooth removed two reported that the operation was done after the onset of the diagnosis of disc displacement with reduction. Of the remaining 97 patients 21 (22%) had had the operation within

**Table 1** Reporting of extraction of a third molar in men and women in each round of questionnaires.

	First round questionnaire (n = 175)		Second round questionnaire (n = 45)		Both rounds combined (n = 220)	
	Men	Women	Men	Women	Men	Women
Have had third molar extracted	13 (46)	71 (48)	3 (33)	12 (33)	16 (43)	83 (45)
Never had third molar extracted	15 (54)	76 (52)	6 (67)	24 (67)	21 (57)	100 (55)
Total responses	28	147	9	36	37	183

Data are number (%).

5 years of the diagnosis of disc displacement with reduction, 21 (22%) more than 5 but less than 10 years, 31 (32%) between 10 and 20 years, and 24 (25%) reported that they had had the extraction more than 20 years before the diagnosis of their condition.

## Discussion

The proportion of patients who had had a third molar removed was higher but not significantly so than in the control population. This suggests that extraction of a third molar does not substantially increase the risk of developing disc displacement with reduction. While the higher proportion of cases than controls who reported having had a third molar removed might have occurred by chance alone it might also be explained if there was a response bias and patients who responded to the questionnaire were more likely to report extraction of a third molar than patients who did not respond. There is some evidence that this may have happened because the proportion of patients who reported extraction of a third molar was higher in responders to the first round questionnaire than it was in responders to the second round questionnaire (48% compared with 33%). This indicates a response bias and it has been shown that non-responders to postal surveys more closely resemble late responders than early responders.<sup>5</sup>

Population estimates of the proportion of adults who have had wisdom teeth removed are not routinely published. The control population, was therefore, compiled using the archived data from the 1998 UK Adult Dental Health Survey as this provides the only robust data to estimate the proportion of adults that have had wisdom teeth extracted in the UK. This control population is not ideal, firstly because it does not identify whether the teeth were removed from the upper or lower jaw, and ideally we should have compared the

proportion of cases and controls who had their lower wisdom teeth removed, and secondly because it is possible that some members of the control group required treatment for undiagnosed disc displacement.

It has been suggested that extraction of a third molar that involves the mouth to be opened wide and the use of considerable force on the mandible might result in trauma to the temporomandibular joint.<sup>1</sup> In patients with disc displacement with reduction this is biologically plausible and trauma to the temporomandibular joint may indeed occur in some cases. However, if important damage to the temporomandibular joint were routinely occurring during extraction of mandibular third molars it would be expected that a large proportion of patients diagnosed with disc displacement would report having recently had such an extraction. Only 21 (9.5%) of 220 patients reported that they had had a wisdom tooth extracted in the 5 years before they were diagnosed with disc displacement with reduction. This suggests that for over 90% of these patients third molar extraction is unlikely to have had an important causal role. Our data do not exclude the possibility that patients who have extractions of third molars under general anaesthesia and those who have a lengthy or traumatic procedure may have an increased risk of developing temporomandibular disorders, a question that could be answered only by a large prospective multicentre study, but it does suggest that for the overwhelming majority of patients attending a TMD clinic with disc displacement with reduction, extraction of a third molar was unlikely to have been the cause.

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