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Original article

An Audit of joint Hypodontia clinic

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A R T I C L E I N F O

Keywords:
Hypodontia, Sidcup

A B S T R A C T

Objective: To assess the type and demographics of patients referred onto the multidisciplinary hypodontia clinic at Queen Mary's Hospital, Sidcup.**Design and setting**: Retrospective audit carried out between December 2012 - 2013 of patients referred to the hypodontia clinic at Queen Mary's Hospital, Sidcup.
Gold Standard: -100% of all patients with hypodontia are referred onto the hypodontia clinic for treatment planning prior to commencing orthodontic treatment.**Materials and Methods:** The clinical notes of 50 patients were assessed for patient demographics, number and type of missing teeth, skeletal and dental malocclusion, presence of any primary dental disease, and the treatment outcome.**Results:** The most prevalent teeth affected in this study group were lower 2nd premolars, followed by upper lateral incisors. 28% of the patients had a family history of hypodontia. The largest percentage of patients with hypodontia (42%)were treated using a combination of fixed appliances and resin bond bridges. **Conclusion:** The audit confirmed that the most prevalent teeth affected by hypodontia were upper laterals and lower second premolars. The audit supports the evidence that hypodontia has a genetic cause.

Introduction

Hypodontia is the congenital absence of teeth resulting from the disturbance in tooth formation during the initial stages. A number of studies into hypodontia have been conducted. These state that the most common teeth not being expressed are third molars; followed by mandibular second premolars, then maxillary lateral incisors [1, 2]. The patient's age, dental health, skeletal base and the number of missing teeth should be assessed to devise the correct treatment plan.

Aims

To assess the demographic characteristics of patients referred to the hypodontia clinic in orthodontic department at Queen Mary Hospital, Sidcup. King's college hospital NHS foundation trust. The type of malocclusion, the number of missing teeth and types of treatment were assessed.

Standards

- Patients with hypodontia are seen by the hypodontia team.
- 100% of all patients suffering with hypodontia are referred onto the hypodontia clinic at the

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Table 1: Data collection sheet

Total Patient	Male ☐ Female ☐ Date of Join Clinic ☐ waiting Length ☐
Referred by	Consultant ☐ Registrar ☐ Dentist ☐ Date of referral ☐
Is patient seen in hypodontia clinic before treatment start?	Yes ☐ No ☐
Family History of Hyopdontia	Yes ☐ No ☐
Incisor Relationship	Class I ☐ Class II/1 ☐ Class II/2 ☐ Class III ☐
Skeletal Relationship	Class I ☐ Class II ☐ Class III ☐
Teeth Missing	Centeral Incisor Upper ☐ Lower ☐ / Lateral Incisor Upper ☐ Lower ☐ / Canine Upper ☐ Lower ☐ / 1st Premolar Upper ☐ Lower ☐ / 2nd Premolar Upper ☐ Lower ☐ / 1st Molar Upper ☐ Lower ☐ / 2nd Molar Upper ☐ Lower ☐ / 3rd Molar Upper ☐ Lower ☐
Age	> 10 yrs ☐ 10 yrs ☐ 11 yrs ☐ 12 yrs ☐ 13 yrs ☐ 14yrs ☐ 15 yrs ☐ 16 yrs ☐ 17 yrs ☐ 18 yrs ☐ 19 yrs ☐ > 19yrs ☐
Crossbite	Yes ☐ No ☐
Microdontia	Yes ☐ Generalized ☐ Loclaized ☐ No ☐
Infra Occlusion	Yes ☐ No ☐
Caries	Yes ☐ No ☐
Gingivitis	Yes ☐ No ☐
Periodonditis	Yes ☐ No ☐
Orthognathic Requied	Yes ☐ No ☐
Restorative Requied	Yes ☐ Composite Restoration ☐ Resin Bonded Bridge ☐ Implant ☐ No ☐

initial treatment planning and prior to commencing orthodontic treatment.

- Patients with IOTN 4th receive NHS orthodontic treatment.
- Patients with > 6 missing teeth receive implant treatment.

Method

Data was collected from 50 patients who attended the hypodontia clinic from December 2012 to December 2013. The following data was collected and evaluated using the data collection sheet – table 1:

- Patient's age.
- Patient gender.

Result

Total Patient	Male 31; Female 19; Date of Join Clinic ; waiting Length 14 Weeks
Referred by	Consultant 34; Registrar 13; Dentist 3; Date of referral
Is patient seen in hypodontia clinic before treatment start?	Yes 50; No 0
Family History of Hyopdontia	Yes 14; No 36
Incisor Relationship	Class I 14; Class 13; Class 10; Class III 13
Skeletal Relationship	Class I 8; Class II 31; Class III 11
Teeth Missing	Centeral Incisor: Upper 3 2, Lower 3 2; Lateral Incisor: Upper 18 18, Lower 4 4; Canine: Upper 6 7, Lower 0 3; 1st Premolar: Upper 9 5, Lower 3 4
	2nd Premolar: Upper 9 8, Lower 14 19; 1st Molar: Upper 1 1, Lower 3 4; 2nd Molar: Upper 2 2, Lower 2 6; 3rd Molar: Upper 9 7, Lower 5 7
Age	> 10 yrs 1; 10 yrs 0; 11 yrs 3; 12 yrs 9; 13 yrs 7; 14yrs 0
	15 yrs 5; 16 yrs 8; 17 yrs 6; 18 yrs 0; 19 yrs 3; > 19yrs 8
Crossbite	Yes 13; No 37
Microdontia	Yes 16 (Generalized 10; Loclaized 6); No 34
Infra Occlusion	Yes 7; No 43
Caries	Yes 9; No 41
Gingivitis	Yes 29; No 21
Periodonditis	Yes 4; No 46
Orthognathic Requied	Yes 4; No 46
Restorative Requied	Yes 32 (Composite Restoration 3; Resin Bonded Bridge 21; Implant 8); No 18

- Patient's referral date.
- Patient's hypodontia consultation date.
- Is patient seen in hypodontia before starting the treatment?
- Referrer: registrar, or GDP, consultant.
- Family history of hypodontia.
- Incisor and skeletal Relationship.
- Missing teeth.
- Other conditions present: microdontia, crossbite, infra occlusion, caries, gingivitis, periodontitis, if an orthognathic surgery was required?

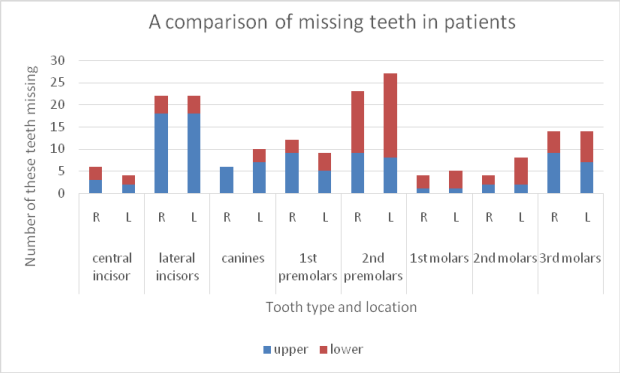


Figure 1: A comparison of hypodontia observed in all patients

- Finally, the type of restorative treatment if required.

Fifty patients were included in the study. The majority of patients were male (62%), whilst the majority of referrals (68%) were made by orthodontic consultants. Speciality Registrar in orthodontic were the next most common referees (26%). Referrals from dentists were only made in 6% of cases. All the 50 patients were seen in hypodontia clinic before the treatment start.

Discussion

The audit data shows a wide range of factors involved in the treatment of hypodontia which need to be considered, including the age of the patient, their general dental health and, the size of their teeth and the existing spaces and most importantly, the incisor and skeletal relationship.

Figure 1: A comparison of hypodontia observed in all patients showed that the most prevalent teeth affected in this study group were 2nd premolars(25%), followed by lateral incisors(22.5%). These results do exactly reflect those found by [1,2] if we exclude the third molar.

There is some evidence that this tooth loss has an underlying genetic cause, as supported by Isman et al. [3]and the data in this study showing that 28% of the patients (14/50 of the sample group) had a family history of hypodontia may suggest a genetic causal factor.

The majority of this study group, 62% were male, which does not reflect the results of other studies, which usually have a bias to hypodontia in female patients [4,5]. A study by Egermark-Eriksson showed that females are affected more frequently than males by a ratio of 3:2[6].

Figure 2 appears to show that the cases of Hypodontia in this sample at least tend to increase slightly with age, although the relatively small sample size would need to be reviewed in order to confirm this. The audit shows all patients seen in hypodontia clinic prior to commencing orthodontic treatment (100%).

Regarding waiting times, the mean for this study group was 14 weeks, which compared with an Irish study[7]where patients were referred to from one waiting list to another rather than having a direct referral to the hypodontia clinic. A Scottish PHCT document suggested that a 12 week maximum wait for referral should be the norm [8].

As for as various treatment options are concerned, resin bond bridges with no restorative approaches in which the space is to be planned to close are the most common course of action in this sample. In the study by Gill et al. [9]missing second premolars, which were a commonly missing tooth in this study, can be treated in a number of different ways including resin Bond Bridge, dental implant or closing the space depending on the remaining tooth pattern in the mouth and also the dental hygiene regime of the patients. Space closure by orthodontic fixed appliance is suggested to be a useful option, as this may avoid restorative treatment, and this appears to be one of the considerations in the patients to compensate the incisor and skeletal discrepancy.

Dental hygiene is also a factor to be considered, as bridges and other permanent gap closures require to

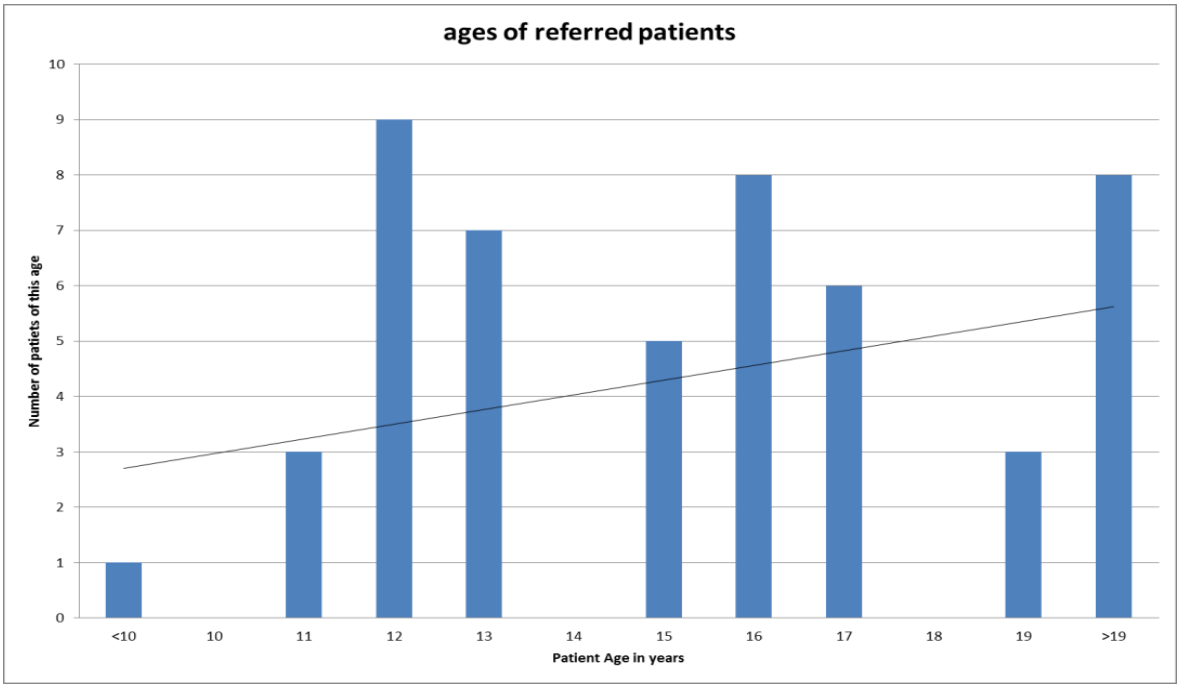


Figure 2: Ages of referred patients

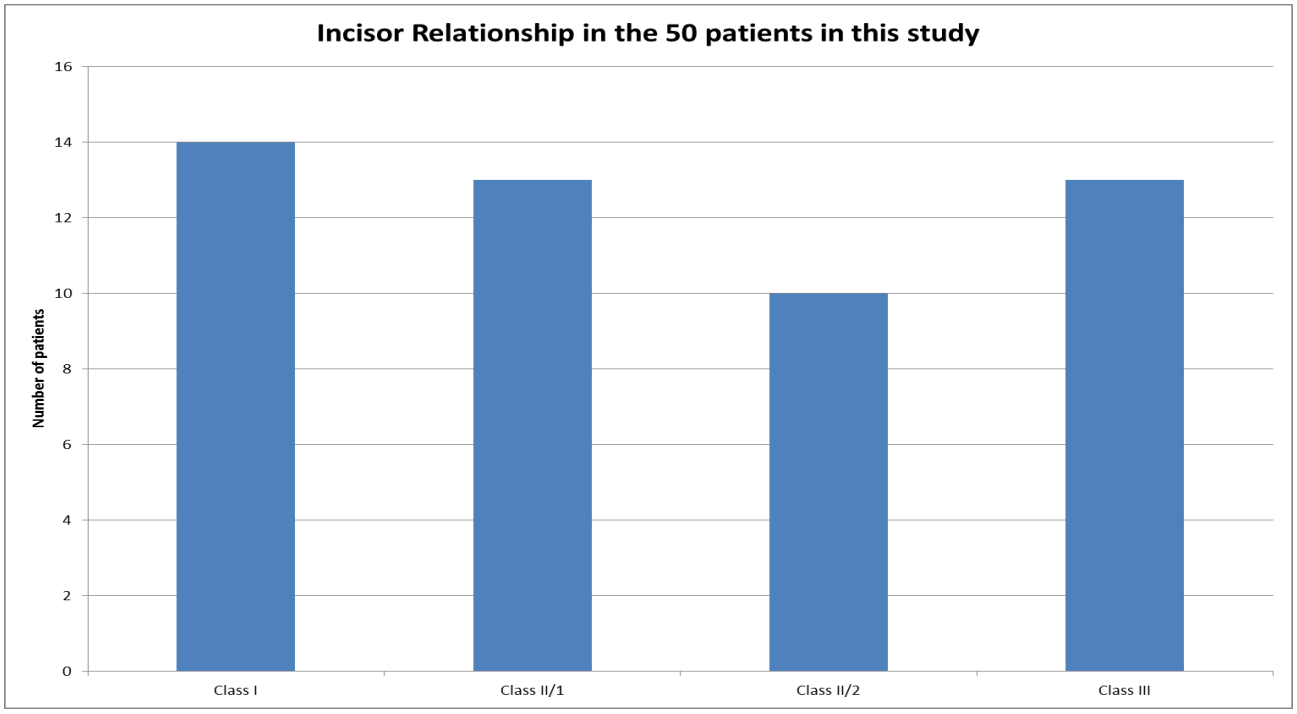


Figure 3: Incisor relationship

The mean age of patients in this sample was 15 years. This would indicate that the target range of patient ages,<10 to>19, was reasonably evenly distributed, although there was a slight bias towards older patients, as is shown in the trend line.

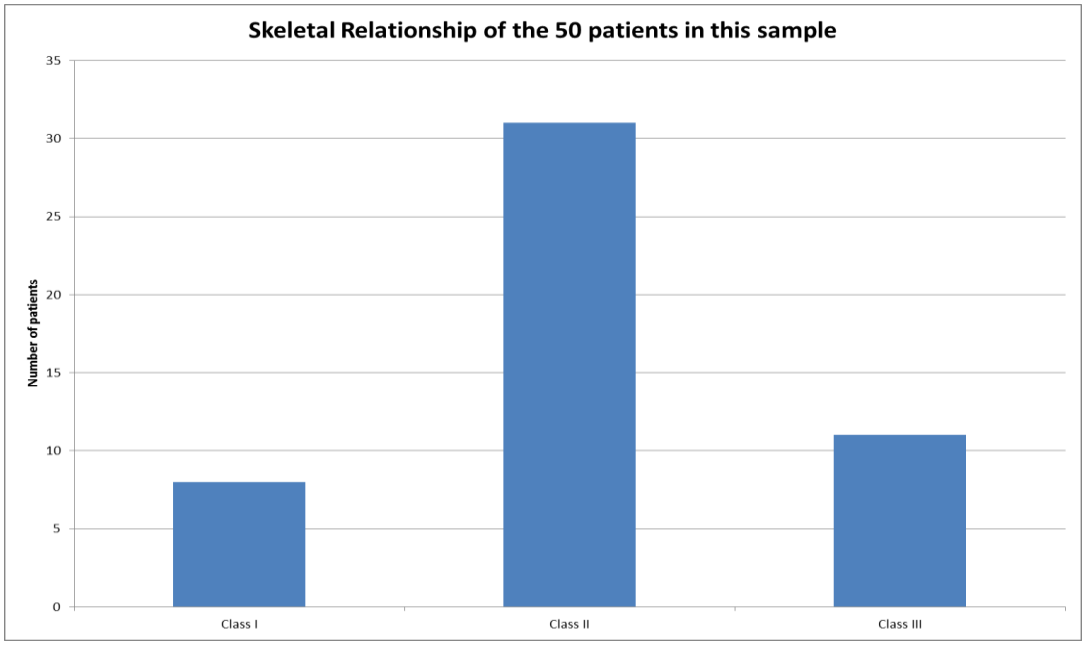


Figure 4: Skeletal relationship

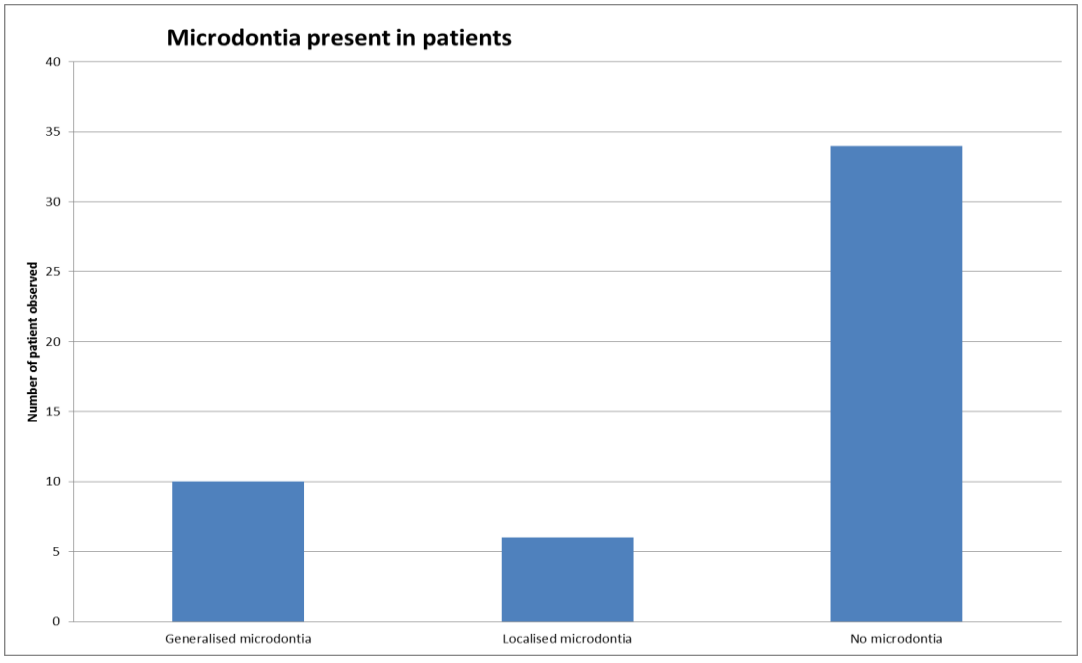


Figure 5: Instance of microdontia

Figures 3 and 4 indicate that a large proportion of the 50 patients in this study had class II malocclusion incisor relationship and skeletal relationships respectively.This data shows that 32%of all patients surveyed had microdontia either localised or generalised.

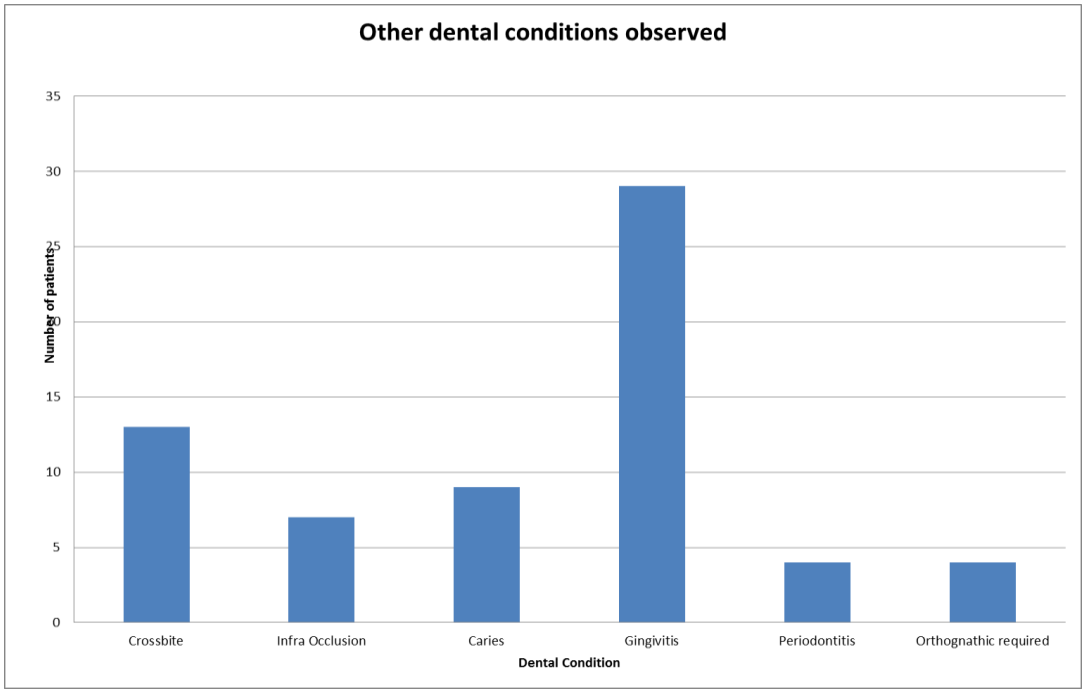
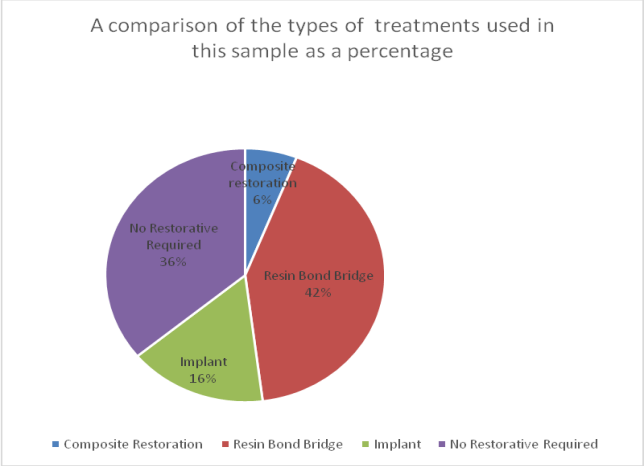


figure 6: Other conditions observed in sample group

Despite the figures for patients with class II and III malocclusion, only 4 patients were deemed to require orthognathic treatment.

Treatment Plans Results:



The largest percentage of patients with hypodontia was treated using resin bond bridges and a similar percentage required no need for restorative treatment. Dental implants and composite restorations accounted for a total of 22% of all cases. All patient seen in hypodontia clinic before treatment started.

maintain good oral hygiene as discussed by Robertsson & Mohlin[10]who noted an increase in gingivitis and plaque on the prostheses. As 29 of patients in this study already showed signs of gingivitis, this may be a factor to be considered, whether to close the spaces present using prosthesis or not, in addition to the other clinical finding.

Closing of space by orthodontic treatment is one of the options for treatment of hypodontia and this depend on several factors, mainly the incisor and skeletal relationship. However, in case of missing upper lateral incisors the size, shape and colour of the upper canine are important to decide replacement of the upper laterals. These may have been one of the reasons for the decision to perform no restorative work at this stage, as can be seen in (**Error! Reference source not found.** where no restorative work was done for 36% of patients [11].

The opening of the space for lateral incisors to allow for a crown or similar implant provides the best aesthetic treatment, although if this is not possible, then space closure is also suggested using a fixed appliance. As summarised by Asher & Lewis[12], the ideal for the anterior teeth would be to achieve accurate simulation of the ideal anterior teeth, which in the case of anterior teeth would often involve some form of restorative work. There is also a case made for transplantation of a molar to a position further forward in the mouth or a prosthetic gap closure, even in earlier papers [13].

Use of conventional porcelain fused to metal bridgework is generally limited to the older patient and where resin-bonded bridgework is contra-indicated by the presence of large restorations. In the young patient, the necessary tooth reduction attracts the risk of pulp exposure and subsequent periapical pathology because of the large pulp.

Action Plan

- Further audit into 2nd Premolars and lateral incisors regarding treatment options as they most common.
- A larger, wider reaching study to confirm patterns here should be undertaken for patients[14]Further investigation into waiting times for the clinic could be done to ascertain how other clinics do this more effectively and in a timelier manner.

Conclusions

Hypodontia cases are able to be treated in a variety of ways. These depend on the age of the patient, how they perceive the space and the shape of their teeth, number of missing teeth, incisor and skeletal base and existing conditions such as infra occlusion, crossbite or microdontia as well as presence of gingivitis and periodontitis due to a poor dental hygiene. As this study has shown, the current preferred treatments in patient with hypodontia is either no restorative treatment with space closed or the use of a resin bond bridge due to the process being less invasive, despite being a less durable solution for the patient[1]. This could be attributed to either the cost of an implant, or to allow the younger patient to finish growing before a more permanent alteration is made as the gaps may close spontaneously.

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