McNamara, C., Mittal, T., Daly, D., Sandy, J., Ireland, A., & Puryer, J. (2018). Dental Decay and the Oro-Facial Cleft Affected Child: West of Ireland. *International Journal of Dental and Health Sciences*, *4*(5), 1035-1041.

Original Article

International Journal of Dental and Health Sciences
Volume 04,Issue 05

DENTAL DECAY AND THE ORO-FACIAL CLEFT-AFFECTED CHILD: WEST OF IRELAND

Catherine McNamara[1], Tarun Mittal[2], Dympna Daly[3], Jonathan Sandy[4], Anthony Ireland[5] ,James Puryer[6]

1.Consultant Orthodontist, St James's Hospital, Dublin 8, Ireland
2.Post CCST Registrar, Leeds Dental Institute and York Teaching Hospital, England
3.Specialist Paediatric Dentist, Forster Street, Galway, Ireland
4.Dean of Health Sciences, University of Bristol, Bristol, England
5.Professor of Orthodontics, Bristol Dental School, Bristol, England
6.Senior Clinical Teaching Fellow, Bristol Dental School, Bristol, England

ABSTRACT:

The study objective was to measure dental caries experience in the cleft lip and/or palate population in the West of Ireland by undertaking a retrospective review of clinical records of all cleft patients attending between 2000 and 2016. The main outcome measures were dmft/DMFT index, ethnicity, age, gender, cleft type, medical, social and family history, preventative dental measures provided. One hundred and twenty patients were identified: 116 Caucasian and 4 non-Caucasian. Age range: 7 months to 17 years. Male:Female 56:64. Cleft lip and palate (CLP): Cleft palate (CP) 52:68, Male:Female CLP 30:22, M:F CP 26:42, Syndromic: Non-Syndromic 19:101. Mean age at first dental visit 2.6 years. Dentally fit: 96.7%. Zero dmft/DMFT 66%. Mean dmft/DMFT 1.57 (range 0-18). With a paediatric dental service in existence for 21 years, the dmft/DMFT has been significantly reduced (1.57). Where caries did present, it was related to late referral.

Keywords: Caries, Cleft, Child

INTRODUCTION:

Cleft lip and/or palate (CL±P) is one of the most common congenital malformations of the head and neck.[1] In Ireland, approximately 100 cleft-affected children are born annually. Epidemiological data relating specifically to the Republic of Ireland is scarce, but the incidence of orofacial clefting has been reported as 1:625 live births, with roughly equal distribution between isolated cleft palate (CP) and CL/P with 14% being related to some sort of chromosomal or syndromic abnormality.[2] This special group of patients have many and pan-disciplinary treatment requirements that occur at different intervals in the course of the child's growth and development. Together with the long-term well-being benefits of good oral health, a caries-free dentition is critical to the successful outcomes of the various dental operative procedures, conservative and surgical, which are necessary during the child's many years of multidisciplinary dental care.

There is a relationship between socioeconomic status and the incidence of CL/P, with higher incidence reported in areas of increased deprivation.[3-5] An association also exists between

*Corresponding Author Address: Dr. James Puryer. E-mail: James.Puryer@bristol.ac.uk

deprivation and prevalence of caries and early childhood caries in non-cleft children.[6,7] It has long been recognised that CL/P children have higher caries prevalence than non-affected children. [8-12] Children with CL/P are more than twice as likely to undergo a hospital admission for dental treatment as an unaffected child.[13] The caries minimising effect of early preventative programmes and regular dental attendance have been demonstrated in both cleft[14] and non-cleft children. [15,16]

When the Health Service Executive in the West of Ireland established a Regional Orthodontic Service in the mid 1990's protocols were implemented to identify oro-facial cleft-affected infants born in the region and ensure they had direct access to specialist paediatric dental care within the first year of life. The aims of this initiative were to provide the necessary preventative dental measures and expertise, with the objective of rendering the cleft-affected child dentally fit and caries-free through to adulthood.

In 2000, all CL/P children born or living in the West of Ireland since 1980 (n=90) were reviewed and an oral health assessment was carried out.[17] The greater caries experience of the cleft-affected children was not unexpected and reflected international findings.[8-10] There was a significantly increased prevalence of caries in the primary dentition in children with CL/P when compared to matched (age, gender, socio-economic status) non-cleft controls (2.52 and 0.93 respectively, $p<0.0001$). Those children born in the mid to late 1990s (n=23), and who were treated in this specialist dental service, had a dmft/DMFT of zero. Their mean age at first dental visit was 21 months compared to 5.7 years for children born in the 1980s. This then gave a strong steer on the need for early preventative care for children with CL/P. [17] This service has now been in operation for 21 years. The aim of the present review was to determine if the expected improvement in dental caries experience in the CL/P population in the West of Ireland was sustained.

MATERIALS AND METHODS:

A retrospective investigation of all patient records attending the paediatric dental service in Galway city from January 1st 2000 to January 1st 2016 was carried out. The dmft/DMFT index was determined by a clinician calibrated in WHO protocols. Manifest caries was registered if there was definite visual evidence with a breach in the enamel and extension into dentine. Blunt probes were used to confirm the visual diagnosis of dental caries. In doubtful cases teeth were underscored. In the case of filled teeth with further decay no distinction was made between primary decay; cavity not in contact with the filling and secondary decay; cavity in contact with the filling. Available radiographic data was used where appropriate and only to confirm developmentally absent teeth. Teeth missing for reasons other than caries were excluded. The following data

was also recorded: age at first dental visit, gender, ethnicity, cleft type and if syndromic or non-syndromic, preventative measures provided (oral hygiene, dietary home care advice, topical fluoride and fissure sealant applications), medical, social and family history.

RESUTS:

One hundred and twenty subjects were identified, 116 Caucasian and 4 non-Caucasian. Age range of subjects was 7 months to 17 years, with a mean age of 7.1 years. Within this age range, 37.5% (n=45) were aged 0 < 5 years and 62.5% (n=75) were aged > 5 years (Table 1). There were more females (n=64) than males (n=56) affected. In relation to cleft type 43.3% (n=52) were CLP, while 56.7% (n=68) were CP only. Within the CLP group, 42.3% (n=22) were female and 57.7% (n=30) male. Fifteen percent (n=19) were CL, 22% (n=26) UCLP, 6% (n=7) BCLP with 57% (n=68) CP (Table 1). Within the CP group, 38.2% (n=42) were female and 61.8% (n=26) male. Eighty four percent (n=101) were non-syndromic and 16% (n=19) syndromic. Forty seven percent (n=9) of syndromic subjects had CP and 53% (n=10) CLP. Syndromes identified included Pierre Robin Syndrome (n=8), Stickler Syndrome (n=3), Downs Syndrome (n=2), Goldenhar Syndrome (n=1), Kabuki Syndrome (n=1), DiGeorge Syndrome, (n=1), Fetal Alcohol Syndrome (n=1), Malpuech Syndrome (n=1) and one child with an unclassifiable syndrome. There was a family history of CL/P in 3.3 % (n=4). Social history was relevant for 1.7% (n=2) since both had been adopted.

Mean age at first dental visit was 2.6 years with a range of 2 months to 13 years. All had received oral hygiene instruction, dietary and home care advice. Excluding one infant yet to commence dental development, all subjects 100% (n=119) received topical fluoride application, with 96.6% (n=115) receiving more than one application of fluoride. One hundred and fifteen (96.7%) were dentally fit. Incomplete primary molar eruptions were apparent in 31.7% (n=38) of patients and excluding these subjects 68.3% (n=82) were eligible for fissure sealants. Of these 82 children, 81.7% (n=67) received fissure sealants, 14.9% (n=10) were in primary teeth only; 49.3% (n=33) were in permanent teeth only and 35.8% (n=24) were placed on both primary and permanent teeth. Some, 18.3% (n=15), received no fissure sealants as they were either not clinically indicated or the child was still undergoing difficulties with dental management. Reassuringly, 66% (n=79) had a zero dmft/DMFT. Eighty seven percent (n=77) of those older than five years of age had zero dmft/DMFT. Mean dmft/DMFT was 1.57. All 10 subjects who presented with decay were later referrals.

DISCUSSION:

It is generally accepted that children with CL/P experience a higher prevalence of caries than their non-cleft counterparts. The Republic of Ireland has had a

fluoridated water supply since 1960 enabling cleft-affected children in the West to have a lifelong exposure to fluoridated water. When compared to dmft/DMFT of children in countries across Europe, the caries experience of children in the fluoridated West of Ireland has been extremely low for many decades, with the mean dmft/DMFT reported as 1.0 to 1.3 with 63% to 70% of children having a dmft of zero.[18-20] There have been some studies that have not found any difference between cleft and non-cleft children's caries experience.[14] but the matched controls in this study were drawn from patients attending a hospital trauma clinic, not the general population.

Prior to the establishment of the HSE West, Regional Orthodontic Service in the mid-1990's and implementation of this specific Paediatric Dental service in Galway city, a pilot study found the mean age at initial visit was five years, with a mean dmft/DMFT of 4. In 2000, approximately five years after the establishment of the service, a review of the caries experience of cleft subjects born in the West of Ireland from 1980 was carried out.[17] Ninety subjects with CL/P were identified and compared with 100 matched (age gender, socio-economic) non-cleft children. As with other international studies.[8,9,10,21] a significant difference was found in the disease experience between the cleft and control group. The prevalence of dental caries experience was significantly higher in the cleft-affected children ($p<0.05$). The combined mean dmft/DMFT for the control group was 1.50 while for the cleft group was 2.09. The dmft for the cleft group was significantly higher than for the non-cleft controls (2.52 and 0.93 respectively, $p<0.0001$) but there was no difference in DMFT between the groups. The number of children with zero dmtf/DMFT was also lower for the cleft group (22% in cleft group, 41% in non-cleft group). The mean age at first dental visit was lower in cleft children born in 1990's including subjects born just preceding the establishment of the paediatric dental service (21 months) compared with 5.7 years for subjects born in the 1980s.

In 2011, a review[22] of the oro-facial cleft affected children attending the paediatric service in County Mayo (n=13) in the West of Ireland was carried out. The mean age at first dental visit ranged from three months to seven years, with a mean age of 21 months. Excluding two infants who were awaiting the commencement of dental eruption, the mean dmft for the remaining 11 subjects was 0.04. The DMFT for these subjects was zero.

In the present study, the mean dmft/DMFT was 1.57 in cleft affected children, with 66% having a dmft/DMFT of zero. This is similar to the prevalence of dental caries of non-cleft children in the West of Ireland.[18-20] In Scotland, Britton *et al.*[9] have reported dmft/DMFT in cleft and non-cleft populations as 3.24 and 1.86 respectively with only 37% of children with no caries experience.

Similar results are reported internationally in Syria,[8] China [23] and Sweden.[24] Cleft services in the UK were reorganised into a centralised model in the late 1990s following recommendations from the Clinical Standards Advisory Group (CSAG) study of cleft care.[25] The CSAG report also recommended that a Paediatric Specialist Dentist be a core member of the cleft team. Fifteen years following the centralisation of services in the UK the Cleft Care UK (CCUK) study was conducted to compare outcomes at five-years of age with those found as part of the CSAG study. Despite nearly all participants being registered with a general dental practitioner and cleft teams having a paediatric specialist as a core team member, mean dfmt scores did not differ between studies and 44.7% of children in the CCUK study had untreated caries.[26] This highlights the importance of active prevention in these high-risk patients. Preventative programmes have been found to significantly reduce the prevalence of early childhood caries in non-cleft populations, when instigated either before birth or in the first years of life. [15,16]

CONCLUSION:

The provision of specialist paediatric dentistry in the first year of life, as part of the Regional Orthodontic Service, in the West of Ireland has significantly reduced the dmft/DMFT (1.57) of cleft affected children in the region, with over 95% of patients being dentally fit. The presence of active caries was associated with late referral to the service. Dental caries prevention programmes need to start within the first year of life or sooner.

REFRENCES:

1. Mossey PA, Little J, Munger RG, Dixon MJ, Shaw WC. Cleft lip and palate. *Lancet* 2009; 374(9703): 1773-1785
2. McDonnell R et al. Epidemiology of orofacial clefts in the East of ireland in the 25-year period 1984-2008. *Cleft Palate Craniofac J* 2014; 51(4): e63-69.
3. Clark JD et al. Socioeconomic status and orofacial clefts in Scotland, 1989 to 1998. *Cleft Palate Craniofac J* 2003; 40(5): 481-485.
4. Durning P et al. The relationship between orofacial clefts and material deprivation in Wales. C*left Palate Craniofac J* 2007; 44(2): 203-207.
5. Yang J et al. Socioeconomic status in relation to selected birth defects in a large multicentered US case-control study. *Am J Epidemiol* 2008; 167(2): 145-154.
6. Oulis CJ et al. Caries prevalence of 5, 12 and 15-year-old Greek children: a national pathfinder survey. *Community Dent Hlth* 2012; 29(1): 29-32.
7. Pitts NB et al. Children's Dental Health Survey 2013. Report 2: Dental Disease and Damage in

Children: England, Wales and Northern Ireland. 2015.

8. Al-Dajani M. Comparison of dental caries prevalence in patients with cleft lip and/or palate and their sibling controls. *Cleft Palate Craniofac J* 2009 ;46(5): 529-531.
9. NBritton KF, Welbury RR. Dental caries prevalence in children with cleft lip/palate aged between 6 months and 6 years in the West of Scotland. *European archives of paediatric dentistry : official journal of the European Academy of Paediatric Dentistry* 2010; 11(5): 236-241.
10. Antonarakis GS et al. Caries prevalence in non-syndromic patients with cleft lip and/or palate: a meta-analysis. *Caries Res* 2013; 47(5): 406-413.
11. Choa RM et al. Identifying the effect of cleft type, deprivation and ethnicity on speech and dental outcomes in UK cleft patients: A multi-centred study. *J Plast Reconstr Aesthet Surg* 2014; 67(12): 1637-1643.
12. Sundell AL et al. Comparing caries risk profiles between 5- and 10-year-old children with cleft lip and/or palate and non-cleft controls. *BMC oral health* 2015; 15: 85.
13. Fitzsimons KJ et al. Hospital admissions for dental treatment among children with cleft lip and/or palate born between 1997 and 2003: an analysis of Hospital Episode Statistics in England. *Int J Paediatr D* 2014; 24(3): 200-208.
14. Lucas VS et al. Dental health indices and caries associated microflora in children with unilateral cleft lip and palate. *Cleft Palate Craniofac J* 2000; 37(5): 447-452.
15. Gussy MG et al. Early childhood caries: current evidence for aetiology and prevention. *J Paediatr Child Health* 2006; 42(1-2): 37-43.
16. Plutzer K, Keirse MJ. Influence of an Intervention to Prevent Early Childhood Caries Initiated before Birth on Children's Use of Dental Services up to 7 Years of Age. *Open Dent J* 2014; 8: 104-108.
17. Hewson AR et al. Dental experience of cleft affected children in the west of Ireland. *Int Dent* J 2001; 51(2): 73-76.
18. Marthaler TM et al. The prevalence of dental caries in Europe 1990-1995. *Caries Res* 1996; 30(4): 237-255.
19. Reich E. Trends in caries and periodontal health epidemiology in Europe. *Int Dent J* 2001; 51(S6): 392-398.
20. Whelton H et al. North South survey of children's oral health in Ireland 2002. http://health.gov.ie/wp-content/uploads/2014/03/oral_health_report.pdf. (Accessed May 3 2017)
21. Tannure PN et al.Caries experience in individuals with cleft lip and palate. *Pediatr Dent* 2012; 34(2): 127-131.

22. Waldron JM et al.Cleft-affected children in Mayo: 1999-2007. *J Irish Dent Assoc* 2011; 57(6): 316-318.
23. Zhu WC et al. Caries experience in individuals with cleft lip and/or palate in China. *Cleft Palate Craniofac J* 2010; 47(1): 43-47.
24. Sundell AL et al.. Caries prevalence and enamel defects in 5- and 10-year-old children with cleft lip and/or palate: A case-control study. *Acta Odontol Scand* 2016; 74(2): 90-95.
25. Sandy J et al. The Clinical Standards Advisory Group (CSAG) Cleft Lip and Palate Study. *Brit J Orthod* 1998; 25(1): 21-30.
26. Smallridge J et al. Functional outcomes in the Cleft Care UK study – Part 3: oral health and audiology. *Orthod Craniofac Res* 2015; 18: 25-

TABLE:

Table 1. Cleft type, age and gender of participants in this study

CLEFT TYPE	MALE	MALE	FEMALE	FEMALE	TOTALS (N=120)
	< 5 years	>5 years	< 5 years	>5 years	
CL	4	7	2	6	19
UCLP	5	11	4	6	26
BCLP	1	2	0	4	7
CP	6	20	23	19	68