



# Changing referral patterns to a designated craniofacial centre over a four-year period

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## KEYWORDS

Craniofacial surgery;  
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**Summary** Craniofacial conditions are mainly treated within England by four supra-regional centres. Due to a continuous increase in the number of cases referred to our service we audited the source and nature of these referrals. Data was prospectively collected over a four-year period from April 2004 to March 2008. The speciality of the referring clinicians was recorded, along with the diagnosis.

A year-by-year increase in the number of referrals from 138 in 2004–2005 to 253 in 2007–2008 was seen. There was a 214% increase in the number of patients referred with single suture craniosynostosis, a 520% increase in patients with benign hyperplastic conditions such as fibrous dysplasia, neurofibromatosis and vascular anomalies and a 220% increase in patients treated elsewhere but now needing revision surgery. A 407% increase in referrals for positional plagiocephaly was recorded.

Our referral pattern reflects the internationally accepted increase in the incidence of metopic synostosis and positional plagiocephaly. Due to the skill mix and experience present in a designated craniofacial service other benign hyperplastic and hypoplastic conditions are increasingly being referred. Additional referrals have come from a change in the referral pathway. To manage the increased workload we have established separate clinics to manage vascular anomalies and have adopted a policy of not reviewing patients with positional plagiocephaly.

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Craniofacial surgery deals with complex and rare conditions with an overall incidence of less than 1:4000.<sup>1,2</sup> These

anomalies comprise a diverse group of conditions that have been sub classified by the National Health Service National Commissioning Group (NCG) as (i) craniofacial clefts (ii) craniofacial dysostosis (iii) craniosynostosis, (iv) encephaloceles and (v) overgrowth (hyperplasia) or undergrowth (hypoplasia) of the skull.<sup>3</sup> England has a unique system of healthcare delivery for craniofacial patients with

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congenital conditions. Within England craniofacial conditions have been treated by four nationally designated supra-regional centres since 1988.<sup>4</sup> The full spectrum of craniofacial conditions is treated by these centres. Since its inception in 1978 our service has seen a steady increase in the number of referrals received. This has become more apparent during the last four years where the number of referrals has grown rapidly. Due to this increase we audited the source and nature of the referrals made to our service.

## Patients and methods

An analysis was conducted of all patients referred to our designated craniofacial service over a four-year period from April 2004 to March 2008. The yearly periods were based on financial years from the beginning of April each year to the following March. Data was prospectively collected from the referral letter and through computerised records of the initial outpatient attendance. The following data sets were recorded: the final diagnosis, the speciality of the referring doctor, the age of the patient at the time of referral and whether the patient had undergone previous surgery at another centre prior to referral.

## Results

The results are summarised in [Figures 1–8](#).

### Overall numbers

There was an 83% increase in the overall number of referrals from 138 to 253 in 4 years ([Figure 1](#)). This increase was due to an increase in the number of referrals for craniosynostosis, positional plagiocephaly, hypoplastic and hyperplastic conditions.

### Craniosynostosis

All syndromic and non-syndromic cases of craniosynostosis were included where there was single or multiple calvarial suture involvement. A 222% increase, from 55 to 122, in the number of patients referred with craniosynostosis was

seen. The largest increases were seen with metopic and sagittal synostosis. The number of cases of lambdoid synostosis was low and static ([Figure 2](#)).

### Hypoplastic conditions

For the purposes of this study, hypoplastic conditions refer to those conditions where there is undergrowth of the structures of the face. There was an overall increase of 633% in patients seen with hypoplastic conditions. However, this did represent the smallest group of patients, reflecting less than 10% of our overall practice with an increase in the number of cases from 3 to 19. The largest increase was seen with those patients referred for orthognathic surgery with midface or mandibular hypoplasia ([Figure 3](#)).

### Hyperplastic conditions

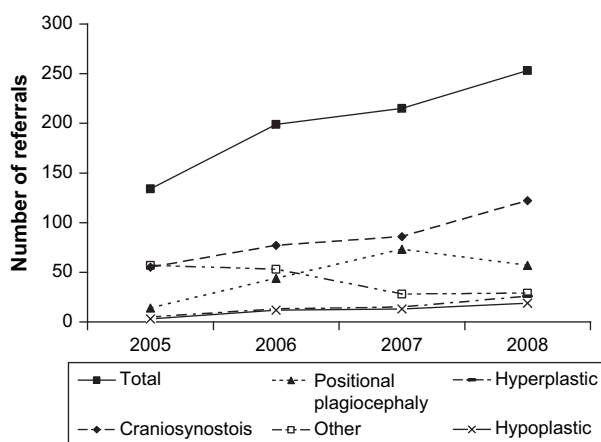
A 520% increase, from 5 to 26 cases, in patients with hyperplastic conditions such as fibrous dysplasia, neurofibromatosis and vascular anomalies was recorded ([Figure 4](#)). The majority of the increase was due to referrals for vascular anomalies or neurofibromatosis. The number of referrals for cancer or fibrous dysplasia was constant.

### Other

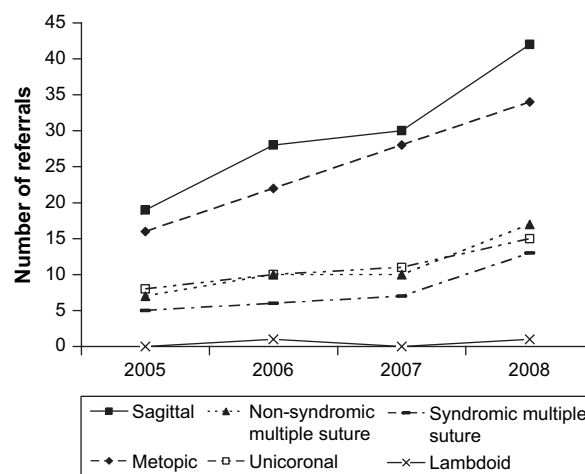
Due to the myriad of craniofacial conditions it is not possible to describe each separately so some grouping of conditions is necessary and not every diagnosis can be discussed if there are only one or two cases in a four-year period. There was a fall in the number of trauma and cranioplasty cases referred whilst the number of craniofacial clefts and craniofacial dysostoses (e.g. cranio-cleido dysostosis or fronto-nasal dysplasia) remained constant ([Figure 5](#)).

### Referring clinician

The referring clinician was categorised into one of four groups: paediatrics, primary care, one of the 'home' craniofacial specialities (plastic surgery, oral and



**Figure 1** Annual number of referrals for different craniofacial conditions 2005–2008 showing an overall 83% increase.



**Figure 2** Annual number of referrals for craniosynostosis 2005–2008 showing an overall 222% increase.

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