

# Children, Youth and Women's Health Service Research Report 2004

## Australian Craniofacial Unit

HEAD: Professor David David  
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### Overview of departmental research

In 2004 the Unit continued its work on the craniofacial deformity project which involved the two pronged approach of studying phenotype and recording the genotype of selected craniofacial pathologies. In addition this year saw the project also focus on the area of cell culture in conjunction with Dr Barry Powell of the Child Health Research Institute. Also the Department has continued to review clinical outcomes and the long-term management of patients.

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## 1

### Long-term results of the treatment of craniosynostosis syndromes

*DJ David*

Over the past 30 years the Australian Craniofacial Unit (ACFU) has managed the care of over 300 patients with craniosynostosis syndromes. These syndromes include Apert, Crouzon, Pfeiffer, Saethre-Chotzen, Cohen (craniofrontonasal dysplasia), Muenke and Antley-Bixler syndromes. There are set treatment protocols from birth to maturity for these patients, developed by the ACFU, which cover all aspect of their treatment. In this project the long-term results of this multidisciplinary management were assessed with respect to both function and form.

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## 2

### The management of rare craniofacial clefts

*DJ David*

Since 1975, the Australian Craniofacial Unit has assessed 828 patients with rare craniofacial clefts that could be classified by the Tessier system. In this project the Tessier system was assessed along with the protocol for treatment and the principles of management.



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## 3

### Aesthetic craniofacial surgery of the orbita/malar region

*DJ David*

For the last 30 years the Australian Craniofacial Unit has been treating patients with facial deformities. This project dealt with the aesthetics of the craniofacial skeleton in the orbita/malar region with reference to normal measurements and various pathological conditions including trauma, congenital malformation and tumours.

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## 4

### Distraction osteogenesis

*DJ David*

There is a significant problem in medicine regarding the proper introduction of new technology. The arrival of the bone distracting technique in the management of craniofacial deformity has been greeted with enthusiasm and has proceeded with such popularity that rational management has often become difficult. The Australian Craniofacial Unit has seen the opportunity for introduction of distraction osteogenesis in the following clinical situations: mandibular hypoplasia in children, the craniosynostosis syndromes and craniofacial microsomia. Each of these clinical conditions has an established, reported treatment protocol. The aim of this project was to determine the place of distraction osteogenesis in each of these clinical conditions, where and how it can be introduced into the established management protocol and how the outcomes might be measured.

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## 5

### The future of craniofacial surgery

*DJ David*

The objective of this project was to analyse the current status of the delivery of health care to the craniofacially deformed world wide; to outline the position of the International Society of Craniofacial Surgery in delivering this health care; and to document some of the strategies that may be employed to achieve this goal.



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## 6

### The effect of non-syndromic craniosynostoses on intracranial volume

*DJ Netherway, PJ Anderson, DJ David*

In recent years comparisons between intracranial volumes of patients with craniosynostosis (premature fusion of cranial sutures) and normal have given variable results leading to questions regarding the validity of the normal reference material and whether the measurement techniques were comparable. Here, the intracranial volumes of patients with non-syndromal craniosynostosis without previous surgical intervention have been compared to intracranial volumes of a normal population of European descent determined using the same methodology. Intracranial volume determination was based on measuring the area of intersection in each CT slice. For comparisons, the intracranial volume measurements for each patient were standardized with regard to age and sex by expressing the intracranial volume measurements in terms of the standard deviation score. Only the male metopic synostosis group had a tendency toward smaller intracranial volume than normal ( $p=0.04$ ). Partitioning the male metopic data into age groups below and above 7 months revealed that the younger children had normal intracranial volume while the older children had, on average, smaller intracranial volume ( $p=0.02$ ). Both the female sagittal synostosis and the male unilateral coronal synostosis groups had larger than normal intracranial volumes, both with  $p<0.001$ . There was no evidence that the intracranial volumes of patients with non-syndromal craniosynostosis are smaller than normal except for males older than seven months with metopic synostosis.

## 7

### Craniofacial morphology differences between skeletally normal patients of Malay and European descent

*DJ Netherway, PJ Anderson, DJ David; with A Yusof (Universiti Sains Malaysia); GC Townsend (Dental School, University of Adelaide); KL McGlaughlin (University of Adelaide)*

Morphometric studies of patients with craniofacial abnormalities require comparative data from different populations to take into account ethnic craniofacial differences. Using 3D CT cephalometry the positions of up to 115 skeletal landmarks have been determined for 205 skeletally normal Malay patients presenting for craniofacial CT scans at Universiti Sains Malaysia Hospital, Malaysia and 20 skeletally normal patients presenting at the Australian Craniofacial Unit. Shape differences were assessed using cephalometric variables (distances and angles between landmarks) and principal component analysis. Measurements that lay in the mid-sagittal plane were compared with plain film derived cephalometric normals: Bartia and Leighton (1993) and the Bolton Standards (1975). The cranial base length sella-nasion was found significantly smaller for Malays than Europeans. For children older than five years the cranial base angle (basion-sella-nasion) ranged between 116 and 145 degrees, not significantly different from Bartia and Leighton's European data. For children younger than five there was a tendency for the Malays to have a larger cranial base angle than Europeans. The first mode of the principal component analysis modelled age and size variation while the second mode may be associated with ethnic differences.



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The results were consistent with observations that, in comparison with Europeans, Malays are brachycephalic, have a relatively wider face, and mandibular and maxillary prognathism.

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## 8

### Shape analysis of the craniofacial skeleton in individuals with and without craniosynostoses

*DJ Netherway, PJ Anderson, DJ David; with A Yusof (Universiti Sains Malaysia); GC Townsend (Dental School, University of Adelaide); KL McGlaughlin (University of Adelaide)*

The premature fusion of one or more cranial sutures (craniosynostosis) in infants results in a range of head shapes depending on which sutures are affected. The more severe syndromal craniosynostoses affect multiple sutures and usually other systems. Our aim is to develop quantitative measures for abnormal anatomical variation that are suitable for diagnosis, assessment of severity and correlation with genetic diagnosis. Skeletal landmark positions have been determined in 3D from CT scans of patients with craniosynostosis presenting at the Australian Craniofacial Unit. One of us (A Yusof) has measured a large (n=205) cohort of skeletally normal Malay patients presenting for craniofacial CT scans at Universiti Sains Malaysia Hospital, Malaysia. Determination of a similar set of craniofacial measurements for individuals of European descent is also underway. Here we report on the measurements we have to date, methods of acquisition, and shape variation in the material analysed. Shape differences were assessed using specific anthropometric variables (distances and angles between landmarks) and principal component analysis. We anticipate identifying useful measures for treatment planning and assessment of the outcome of patient management.

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## 9

### Facial parameters of Pierre Robin sequence at skeletal maturity

*PJ Anderson, MN Nugent, DJ David*

Significant clinical features of Pierre Robin sequence are an isolated cleft palate and micrognathia present at birth. This combination of anomalies may result in upper airway obstruction which, if present, has historically been treated with early surgical intervention to lengthen the mandible. For this project it was decided to review all cases treated at the Australian Craniofacial Unit who had reached skeletal maturity to evaluate the facial growth during childhood and to assess the need for surgery.

Fifteen cases were identified and those meeting the entry criteria had a diagnosis of Pierre Robin confirmed by clinical genetics and had reached skeletal maturity. Cephalometric analysis (Steiner-Tweed) of all lateral cephalograms of these cases was undertaken blindly by independent clinicians.

A variety of outcomes at skeletal maturity but nine out of 15 had facial hypoplasia, however only three out of 15 cases underwent any corrective surgical intervention.



## 10

### Management of facial dysmorphogenesis in Nemaline Myopathy

*PJ Anderson, JH Barker, DJ David*

Nemaline myopathy is a rare congenital muscle disease, which is both clinically and genetically heterogeneous. Both neonatal and adult onset can occur. In those with neonatal onset the resulting muscle weakness can affect the facial musculature and hence influence facial growth. For this study a single case was reviewed. The patient was referred for management at the age of ten with a characteristic long face and hypotelorism. She had an open bite with a class II/div I malocclusion on a skeletal class II base, abnormal tongue thrust and difficulties with speech articulation. After multidisciplinary review, orthognathic intervention was considered inevitable at skeletal maturity so no orthodontic intervention was undertaken until later, although a course of speech therapy was commenced. The natural dysmorphic growth continued until decompensating orthodontic alignment commenced at skeletal maturity, consisting of rapid maxillary expansion and arch alignment. Subsequent orthognathic surgery consisted of maxillary impaction by 8mm posteriorly but no movement anteriorly to shorten the midface. The mandible underwent bilateral split osteotomy advancement by 5mm to produce a class I incisal relationship. Four months later she underwent rhinoplasty and genioplasty.

The results of this study led to three main points:

- Interceptive orthodontics were not undertaken however, had intervention been possible, the effects of any functional appliance in this condition is uncertain.
- Surgery needs careful consideration because difficulties with general anaesthesia are recognised.
- The treatment of patients with this condition is best undertaken in an environment where multidisciplinary management can be readily coordinated.

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## 11

### Cytogenetic analysis of skull sutures in craniosynostosis

*PJ Anderson, D Netherway, DJ David; with L Smithers, B Powell (Child Health Research Institute); T Roscioli (South Eastern Area Laboratory Services, Sydney); T Cox (University of Adelaide)*

Craniosynostosis is a condition characterised by premature cranial suture fusion in children. This can occur as an isolated anomaly affecting a single suture and can occur with other anomalies as part of a syndrome. The development of craniosynostosis, can be the end result of a number of different molecular abnormalities.

While it is known that the common craniosynostosis syndromes of Crouzon, Apert and Saethre-Chotzen syndrome have underlying mutations of the FGFR or TWIST genes, no mutations have been identified in many cases of single suture craniosynostosis. However, it has been reported that mosaicism can occur with a mutation identified in cells expressing FGFR3 that was not present in circulating leucocyte DNA. We wished to investigate whether this phenomenon could be identified among fusing and normal sutures of the same individuals with single suture craniosynostosis.

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Two cases of single suture craniosynostosis who, following screening, were known to have no underlying mutation of FGFR or TWIST genes were investigated. One had sagittal synostosis, the other unicoronal synostosis and both underwent culture of fusing and normal sutures that had been removed at surgical correction. The cultured cells from both abnormal and normal sutures underwent DNA analysis.

The results showed that no mutations of FGFR or TWIST genes were identified in any cells, therefore mosaicism would not appear to be widespread in single suture craniosynostosis but further results may clarify this.

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## 12

### Do children with submucous cleft palate develop middle ear disease?

*PJ Anderson, DJ David; with D Matison (Otolaryngology)*

Submucous cleft palate (SMCP) is a condition characterised by bifid uvula, notching of the hard palate and with lucency in the midline of the soft palate. Clinically, it may appear that the soft palate is intact which leads to delay in diagnosis, which may not be established until adulthood. Although the mucosa is intact, the underlying muscles are incorrectly aligned (similar to a complete cleft palate). In cases of established cleft palate the high risk of subsequent development of middle ear disease is well established. Many cases require ventilation tubes (grommets) to help prevent infection and damage to the delicate middle ear structures. However, there are currently few studies published on the incidence of middle ear disease in SMCP. In this study twenty cases of SMCP underwent casenote review to establish the incidence of middle ear disease of sufficient severity to warrant surgical intervention.

The results showed that 12/15 cases presented before 10 years of age required at least one surgical intervention, while none of the five cases presenting after this age required intervention. There did not appear to be any differences between the sexes. One case presented aged 10 years with co-existent deafness as a result of recurrent middle ear infection. Therefore, middle ear disease would appear to be very common in SMCP and all cases diagnosed should undergo specialist otolaryngological assessment.

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## 13

### Extended palatal split access for chordoma resection in children

*PJ Anderson, E Tan, DJ David; with S Santoreneous (Neurosurgery)*

Chordomas are rare slow growing tumours arising from the remnants of the notocord and are found in close association with the axial skeleton. Although these tumours are rare they have been reported at a number of sites including sphenoid-occipital skull base (clivus), sacrococcygeal region, cervical, dorsal and lumbar vertebrae. These tumours usually present in early adult life but on occasion present in childhood. In such cases the skull base tumours are particularly difficult to access for excision to be attempted.

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This study reports a multidisciplinary technique used in two cases in children where extended palatal split was undertaken to allow neurosurgical access for excision to be attempted. Casenote review was undertaken to assess the post-operative progress of palatal function. In both cases the palatal function was restored although the older child was still undergoing speech therapy. This approach allowed good access for tumour excision and appeared to have no adverse effects on the upper airway management.

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## 14

### Transfacial approach to basal encephalocoeles

*PJ Anderson, E Tan, DJ David*

Encephalocoeles are rare in Caucasian populations. Most involve herniation of tissue through the nasal region. Encephalocoeles herniating through the sphenoid are exceptionally rare. This study reported a case demonstrating the surgical technique used to manage this particular condition. A girl was born at term following a pregnancy complicated by placental insufficiency and subsequent delivery by caesarean section at 34 weeks. She was noted at birth to have hypertelorism, clefting of the lip and palate and a mass protruding between the two edges of the palate. After transfer for specialist multidisciplinary care, a MRI scan revealed that she had a defect in the sphenoid bone extending anteriorly to its junction with the ethmoid. She was also noted to have agenesis of the corpus callosum.

She was electively taken to theatre at age three months and underwent surgical repair of the encephalocoele via combined facial bipartition and transcranial approaches. This involved splitting the hard and soft palate and both maxillae were moved laterally by osteotomies at a Le Fort III level to allow wide exposure of the mass. The defect in the sphenoid was repaired using calvarial bone graft. At the same operation the midline cleft lip and the palatal split were also repaired.

Post-operatively she made an unremarkable recovery prior to discharge home. She has remained on regular outpatient review and the facial scarring has settled satisfactorily. However, with growth, she has developed midface hypoplasia and is due to undergo corrective orthognathic surgery at skeletal maturity.

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## 15

### Craniosynostosis in Australian Aboriginal people

*PJ Anderson, DJ Netherway, DJ David; with L Smithers, B Powell (Child Health Research Institute);  
KL McGlaughlin (University of Adelaide)*

Craniosynostosis can occur either as an isolated anomaly or with other malformations as part of a syndrome. This pathological process can result from a number of different causes and has been reported in many different human populations. Many of the syndromes are now known to result from an underlying genetic mutation. The cause of single suture synostosis remains unknown in many cases but an underlying genetic cause is suspected. Craniosynostosis in different human populations most commonly affects the sagittal suture. The incidence has been reported to be 1:2500 live births in peoples of European descent,



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but there is little data currently available concerning the incidence in other ethnic groups. However, it has been suggested that the incidence may differ.

The aim of this study was to review the records of the Australian Craniofacial Unit which has been treating patients with this condition for almost 30 years, to identify cases of craniosynostosis in patients who were Australian Aboriginal people and to try to establish the incidence of the condition in this population.

Two cases of sagittal synostosis were identified. No other cases of single suture or syndromic craniosynostosis were identified. In addition a single 200-year-old skull with sagittal synostosis had been sent for evaluation by the South Goolum Goolum Aboriginal Co-operative.

The number of cases treated during this period is much smaller that might have been expected. This raises the possibility that the incidence is truly less in this population. This is also indirectly supported by the confirmation from other Craniofacial units who treat affected individuals in Australia that they unable to identify a single case.

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## 16

### Gene expression profiling of craniosynostosis

*P Anderson; with B Powell, L Smithers, C Wilkinson (Child Health Research Institute); A van Daal, A Coussens (Queensland University of Technology)*

Craniosynostosis comprises a group of devastating developmental disorders that cause craniofacial deformities in infancy as a result of premature fusion of sutures, the growth regions of the skull. To better understand the processes that lead to premature fusion in craniosynostosis we are using gene microarray technology to profile the expression of genes in cranial sutures. Tissues and primary cultured cells established from patients undergoing surgical reconstruction are being screened to identify patterns in gene expression. The microarray analyses and real-time PCR quantification of gene expression are revealing significant differences between sutures and cells and between different sutures. This information will have a major impact on our knowledge of the development and underlying biology of craniosynostosis.

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## 17

### A case of severe hemifacial atrophy with ipsilateral body atrophy

*SM Hwang, E Tan, DJ David*

Scleroderma en coup de sabre and Parry-Romberg syndrome are rare disorders characterized by slow progress of hemifacial atrophy and its generalized involvement is extremely rare. The aetiology, pathogenesis and relationship between the two conditions are obscure. Therefore, there have been some descriptions of hemifacial atrophy with ipsilateral body atrophy as a "Parry-Romberg syndrome with localized scleroderma", "Parry-Romberg syndrome with ipsilateral extremity involvement" or "Overlap syndrome of Parry-Romberg syndrome and linear scleroderma".



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The purpose of this study was to differentiate the diagnosis of the two conditions because of different consequences for their outcome and treatment options. There has been a report that the two conditions can be distinguished by clinical features in over 80% of cases.

Our study showed that it is possible to differentiate between the two conditions using clinical features. Scleroderma en coup de sabre involves cutaneous sclerosis (induration & adhesion), hyperpigmentation or hypopigmentation, atrophic shiny skin and alopecia on scalp or eyebrow. Parry-Romberg syndrome only involves depressed atrophy with normal looking skin. This study also showed that biopsy for histopathology and more specific serology may assist to differentiate between the two conditions. In the early active stage of linear scleroderma, it could be a response to active medications. In the inactive stage of any kind of hemifacial atrophy, multidisciplinary assessment is necessary. Craniomaxillofacial and microsurgical techniques should be used for reconstruction of the surrounding soft tissue and/or underlying skeleton depending on the severity of the case.

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## 18

### Post-operative raised temperature in children with craniosynostosis: is it pathological?

*S Takagi, PJ Anderson, DJ David*

Craniosynostosis is a condition characterised by premature cranial suture fusion in children. The management is surgical excision of an affected suture and re-shaping of the cranium, usually in infancy. Following corrective surgery we have noted in the early post-operative phase that affected patients frequently develop a pyrexia. The clinical impression has been that these do not have a subsequent adverse clinical outcome.

The aim of this study was to review the post-operative temperature charts and clinical notes of a consecutive series of children undergoing a transcranial synostosis correction to evaluate the incidence and significance of any raised temperature.

The results showed that most cases (76%) developed a temperature in excess of 38°C during the first five post-operative days, day 2 being the most frequent. No cases subsequently developed respiratory or wound infections. There were no gender differences. The temperature rise was less in the cases of sagittal synostosis than either coronal or metopic synostosis. This might be due to the differences in the length of their surgical intervention. The rise was less in the cases whose surgery was done when they were under 6 months old. The temperature courses had double peaks in first 48 hours.

Post-operative pyrexia is very common following transcranial correction of non-syndromic craniosynostosis. It appears not to be associated with the development of significant infection, but is a part of the normal physiological response to craniofacial surgery. It is notable that a similar pattern of pyrexia with two peaks in first 48 hours has also been reported after cardiac surgery, but there has been no previous report of this phenomenon following craniofacial surgery.



## 19

### Opitz G BBB syndrome - a clinical review

*SY Parashar, PJ Anderson, DJ David*

Opitz G BBB syndrome is a rare congenital condition characterised by hypertelorism, hypospadias, cleft lip and palate, laryno-oesophageal abnormalities, imperforate anus, cardiac defects and developmental delays. Both X-linked (Xp22.3) and autosomal dominant (22q11.2) inheritance are known. Pathogenesis is unclear, however, most anomalies are midline defects suggesting that the mutation exerts its effect on the midline morphogenetic processes.

This study reviews the management of seven patients; two female, five male aged from seven to 34 years. Five patients were in maturity and two were young with a wide range of presentation from mild to severe. Genetic testing was performed and two males had a recognised error in the MID1 gene.

Management is challenging and has three aspects:

- **Hypertelorism:** present in all, four had undergone transcranial box osteotomy at an average age of 6.5 years. Persistent strabismus and epicanthal folds were postoperative complications.
- **Cleft lip and palate:** present in six patients (four bilateral, one unilateral and one isolated palate). Management was performed according to the ACFU cleft protocol.
- **Hypospadias:** present in all males of penoscrotal and perineal types. No females had hypospadias. Multistaged repair was performed in all.

The results show that a multidisciplinary approach and protocol based management is required to treat all three aspects of Opitz G BBB syndrome.

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## 20

### Visual outcomes and ophthalmic findings in Apert syndrome

*PJ Anderson, M Hammerton, DJ David; with JJ Khong, D Selva (Ophthalmology, Royal Adelaide Hospital)*

Apert syndrome is a condition characterized by craniosynostosis, midface hypoplasia and symmetrical syndactyly of the hands and feet with a birth prevalence of 15.5 in 1 million births that usually arises by new mutation. The midface hypoplasia produces shallow orbits which influence the functioning of the eye. Since most publications relate to case reports or small series, we wished to determine the ophthalmic features, prevalence and causes of visual impairment of a large cohort of patients with Apert syndrome.

A cross-sectional retrospective study of 63 patients with Apert syndrome at the Australian Craniofacial Unit prior to surgical intervention was undertaken.

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Information obtained included patients demographics and ophthalmic findings i.e. visual acuity, cycloplegic refraction, amblyopia risk factors such as refractive errors, anisometropia, strabismus with or without alphabetical pattern, anatomical relationship of periorbital structures and ocular abnormalities such as corneal exposure, exophthalmos, ptosis and optic atrophy.

In the largest study performed on Apert syndrome, visual impairment was shown to be a significant problem prior to any craniofacial surgery. Amblyopia, associated amblyogenic risk factors and optic atrophy are important factors in visual impairment. In the absence of optic nerve changes, optic nerve dysfunction has also been demonstrated in some cases. Common ophthalmic findings include proptosis, ptosis, hypertelorism and V pattern ocular movement; less common were anti-mongoloid slant, nasolacrimal duct obstructions, non-obstructive epiphora, trichiasis, epiblepharon, entropion, iris coloboma and nystagmus.

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## 21

### An analysis of genotype-phenotype correlation in Apert syndrome

*KL McGlaughlin (University of Adelaide); with PJ Anderson, DJ Netherway*

The technology allowing genetic sequencing Apert syndrome has only recently become available. It is now known that in the majority of cases Apert syndrome occurs as the result of one of two mutations of the fibroblast growth factor receptor 2 (FGFR2) gene.

There have only been a few studies that have examined the genotype-phenotype correlation within Apert syndrome and these studies have produced conflicting results. The correlation with genotype of cleft palate occurrence, severity of fusion of the fingers and toes and craniofacial appearance following surgery have been reported, however, these results have not been substantiated by other groups. Due to the paucity of available data in the existing literature it is not possible to establish whether a genotype-phenotype correlation exists and to ultimately determine whether different management protocols are required to achieve optimal outcomes within the two genotypic groups.

The aim of this retrospective study was to evaluate the morphology and determine if a genotype-phenotype correlation exists in Apert syndrome particularly in respect to craniofacial morphology and surgical outcomes.

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## Staff participating in research

### **Dr PJ Anderson**

*MD, FDSRCS(Ed), FRCS(Eng), FRCS(Plast), FRACS, Senior Craniofacial Fellow*

### **Dr SM Hwang**

*MD, PhD, Craniofacial Fellow*

### **Dr DJ Netherway**

*BSc (Hons), PhD, Apex Foundation Research Fellow*



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## **L Netherway**

*BEd(Sc)*, Research Assistant

## **Dr SY Parashar**

*MBBS, MS, MCh*, Craniofacial Fellow

## **Dr Z Rajion**

*BDS, GradDipClinDent*, PhD Candidate

## **R Sells**

*LACST*, Speech Pathologist

## **Dr S Takagi**

*MD, PhD*, Craniofacial Fellow

## **Mr E Tan**

*FRACS, M MED*, Consultant Craniofacial Surgeon

## **Dr A Yusof**

*BDS, GradDipClinDent*, PhD Candidate

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## International and interstate travel and presentations

### **PJ Anderson**

Australian Society of Orthodontists 19th Biennial Conference, Adelaide, Feb 2004

- *Facial parameters of Pierre-Robin Sequence at skeletal maturity*
- *Management of facial dysmorphogenesis in Nemaline Myopathy*
- *Long-term results of Veau-Wardill-Kilner cleft palate repair*

Royal Australasian College of Surgeons Annual Scientific Congress, Melbourne, May 2004

- *Teratomas*

Australasian Society for Medical Research (ASMR), Adelaide, Jun 2004

- *Cytogenetic analysis of skull sutures in craniosynostosis*
- *Do children with submucous cleft palate develop middle ear disease?*

Colgate Australian Clinical Dental Research Centre Research Day, Adelaide, Aug 2004

- *Mutations within cultured osteoprogenitor cells from sutures in craniosynostoses*

Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004

- *Cytogenetic investigations of cell sutures*
- *Genotype phenotype correlation in Apert syndrome*
- *Long-term results of Veau-Wardill-Kilner cleft palate repair*

4th International Skull Base Conference, Sydney, Nov 2004

- *Teratomas of the skull base*
- *Extended palatal split access for chordoma resection in children*
- *Transfacial approach to basal encephaloceles*

Australasian Society of Human Biology, Canberra, Australia, Dec 2004

- *Craniosynostosis in Australian Aboriginal people*
- *Co-operation with developing countries concerning surgical treatment of craniofacial malformations*
- *Future goals of the International Society of Craniofacial Surgery*



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## **DJ David**

10th Esser Course, Rotterdam, Mar 2004

- *Co-operation with developing countries concerning surgical treatment of craniofacial malformations*
- *Future goals of the International Society of Craniofacial Surgery*

5th Australian Wound Management Association Conference, Hobart, Mar 2004

- *The management of craniofacial deformity*

Royal Australasian College of Surgeons Annual Scientific Congress, Melbourne, May 2004

- *Aesthetic craniofacial surgery of the orbita/malar region*

Brazilian Congress of Craniomaxillofacial Surgery, Rio de Janeiro, Brazil, Jun 2004

- *The future of craniofacial surgery*
- *Protocols for the management of craniosynostosis syndromes*
- *Management of rare craniofacial clefts*
- *Management of craniofacial trauma*

14th China-Japan Joint Meeting on Plastic Surgery, Beijing, PR of China, Sept 2004

- *Syndromal craniosynostosis: long-term results*

Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004

- *Distraction osteogenesis – a personal view*
- *Craniofacial surgery - quo vadis?*

Plastic Surgery 2004, Annual Meeting of the ASPSP/PSEF/ASMS, Philadelphia, USA, Oct 2004

- *Craniofacial surgery - quo vadis?*

## **SM Hwang**

Royal Australasian College of Surgeons Annual Scientific Congress, Melbourne, May 2004

- *The retrospective study of Parry-Romberg syndrome and scleroderma en coup de sabre*
- *A case of severe hemifacial atrophy with ipsilateral body atrophy*

Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004

- *A case of severe hemifacial atrophy with ipsilateral body atrophy*

## **JJ Khong**

Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004

- *Outcomes at visual maturation in Apert*

The Royal Australasian and New Zealand College of Ophthalmologists, Melbourne, Nov 2004

- *Outcomes at visual maturation in Apert*

## **K McGlaughlin**

Australasian Society for Medical Research (ASMR), Adelaide, Jun 2004

- *Clinical and morphometric analysis of sagittal synostosis with FGFR3 mutations*

Colgate Australian Clinical Dental Research Centre Research Day, Aug 2004

- *Sagittal synostosis: do FGFR3 mutations produce severe phenotypes?*

Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004

- *Clinical and morphometric analysis of sagittal synostosis with FGFR3 mutations*

## **DJ Netherway**

Australasian Society for Medical Research (ASMR), Adelaide, Jun 2004

- *Shape analysis of the craniofacial skeleton: craniosynostosis and normal*

Colgate Australian Clinical Dental Research Centre Research Day, Adelaide, Aug 2004

- *3D CT morphometric comparison of skeletally normal Malays and Europeans*



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Australasian Society of Human Biology, Canberra, Australia, Dec 2004

- *Craniofacial morphology differences between skeletally normal patients of Malay and European decent*
  - *The effect of non-syndromic craniosynostoses on intracranial volume*
- Craniofacial Surgical Planning Technical Seminar, Universiti Sains Malaysia, Kota Bahru, Malaysia, Dec 2004
- *Craniofacial imaging and analysis at the Australian Craniofacial Unit*

## **S Parashar**

Colgate Australian Clinical Dental Research Centre Research Day, Aug 2004

- *Opitz G BBB syndrome – a clinical review*
- Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004
- *Opitz syndrome: a clinical review*
  - *Opitz syndrome: a clinical review*

## **S Takagi**

Australasian Society for Medical Research (ASMR), Adelaide, Jun 2004

- *Post-operative raised temperature in children with craniosynostosis: is it pathological?*
- Asian Pacific Craniofacial Association, Seoul, Korea, Oct 2004
- *Post-operative raised temperature in children with craniosynostosis: is it pathological?*

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## International and interstate visitors

### **Panthip Athipanchaphong**

Theatre Nurse, King Chulalongkorn Memorial Hospital, Bangkok, visited the department for three months

### **Dr Kofi Boahene**

Chief Resident Associate training in Otolaryngology – Head and Neck Surgery Mayo Clinic, Rochester, New York, USA, visited the department

### **Dr Batool Qasim Mohammed Fadel**

Senior Specialist Orthodontist, Orthodontic Clinic in the Plastic Surgery Department, Khoula Hospital, visited the department for three months

### **Dr So-Min Hwang**

Associate Professor, Plastic and Reconstructive Surgery Pusan National University College of Medicine, Pusan, South Korea, visited as a Craniofacial Fellow for six months

### **Dr Waleed Janahi**

Maxillofacial Surgeon, Bahrain Defence Force Hospital, Bahrain, visited as a Craniofacial Fellow for twelve months

### **Dr Chul-Sun Kang**

Surgeon, Department of Plastic and Reconstructive Surgery, Pusan National University College of Medicine, Pusan, South Korea, visited for one week

### **Dr Ki-Tae Kim**

Clinical Instructor, Department of Plastic and Reconstructive Surgery, Pusan National University Hospital, Korea visited for one week



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## **Dr Sanjay Parahsar**

Plastic and Reconstructive Surgeon, Bahrain Defence Force Hospital, Bahrain, visited as a Craniofacial Fellow for twelve months

## **Dr Satoshi Takagi**

Plastic and Reconstructive Surgeon, Osaka University School of Medicine, Japan, visited as a Craniofacial Fellow for twelve months

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## Other research-related activity

### **DJ David**

- President, International Society of Craniofacial Surgeons
- Board Member, Asian Pacific Craniofacial Association
- Executive Committee, Australian & New Zealand Society of Craniomaxillofacial Surgeons
- President, Australian Craniofacial Institute

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## Publications

### **Anderson PJ, David DJ**

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### **Anderson PJ, Netherway DJ, Abbott AH, Cox T, Roscioli T, David DJ**

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### **Anderson PJ, Netherway DJ, Abbott AH, David DJ**

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### **Anderson PJ, Netherway DJ, Abbott AH, Moore MH, David DJ**

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### **David DJ**

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### **Schnitt DE, Agir H, David DJ**

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### **Simpson DA, David DJ**

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### **Turner AM, Roscioli T, Elakis G, Taylor PJ, Cox T, Haan E, Oley C, McGraughan J, Dixon J,**

### **Edwards M, Gianoutsos M, David DJ, Buckley MF, Pospisil V**

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