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International Journal of Current Research
Vol. 9, Issue, 05, pp.50635-50637, May, 2017

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

ISSN: 0975-833X

CASE REPORT

DERMATOGLYPHIC, AN ADDITIONAL DIAGNOSTIC TOOL FOR AUTISM- A CASE REPORT

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ARTICLE INFO

Article History:
Received 25th February, 2017
Received in revised form
10th March, 2017
Accepted 17th April, 2017
Published online 23rd May, 2017

Key words:

Infantile Autism, Dermatoglyphics,
Atd angle, Treatment plan.

ABSTRACT

Dermatoglyphic is a science that deals with study of epidermal ridge patterns of sole, palm, and fingertips. These dermatoglyphs are unique for each person, by which number of parameters can be determined. Recently unusual and atypical dermatographs have been found to be associated with mental disorders such as autism. So these parameters could help to diagnose as well as help in treatment planning of individuals. Autism is a complex developmental disorder that usually appears during the first three years of life. The present case report describes a 7-year-old male child with dermatoglyphic patterns that aids for diagnosis and treatment.

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Citation: Dr Babita Niranjan, Dr Ashutosh Dubey, Dr Chandresh Shukla and Dr Shikha Mali 2017. "Dermatoglyphic, an additional diagnostic tool for autism- A case report", *International Journal of Current Research*, 9, (05), 50635-50637.

INTRODUCTION

Kanmer 1944 described a clinical syndrome in children, to which he gave name early infantile autism. It is characterized by a large spectrum of neuropsychics disorders which appears during first three year of life (Tarca & Barabolski, 2003). The term autism was derived from a Greek word "Auto" which means self, so it can be defined as the tendency to morbid self absorption at the expense of regulation by outward reality. These children seem to be self sufficient and introvert (Avila *et al*., 2003). Unlike ordinary children, who when unhappy or tired reach for a parent, autistic children remain detached. Autism is the most common of the pervasive developmental disorders, affecting an estimated 2 – 6 per 1,000 (Courchesne, 1997). It is mutifactorial, as is influenced by both genetic and environmental factors (Walker, 1977). It is clinically manifested by delayed speaking, incapacity of establishing and developing contacts with other (close persons being included), inability of verbal communication, shrink into one's own hermetic world (Rajangam, Janakiram & Thomas, 1995). Dermatoglyphic are the ridge constellations seen on the hand palms and foot soles.

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Dermatoglyphics are formed from the 10th week of pregnancy and by 24th week they remain unchanged. Hence they can be considered as fossils of a specific period of prenatal development (Okajima, 1975). Most commonly studied dermatoglyphic indices incorporate finger and palmar ridge counts, palmar atd-angle, ridge patterns on the fingertips, and palmar flexion crease patterns (PFCs) (Fearon, Lane & Airie, 2001). Variation in dermatogylphic patterns can be subdivided into factorial and stochastic components.

The factorial component includes genetic, macro- and microenvironmental, and ontogenetic components (Graham, Raz, Helor & Nevo, 2010). Dermatoglyphic variation has a strong genetic component but it can also be affected by environmental factors. The stochastic component is variation within individual and represents developmental instability or developmental noise. Unusual and atypical dermatoglyphic ridge patterns are found to be associated with various mental disorders like schizophrenia, alzheimer disease and autism (De Bruin & Esther, 2014). Studies have showed a positive correlation between dermatoglyphics and autistic child. Hence this article is an attempt to present a case where dermatogylphic pattern of an autistic child was used as a diagnostic tool which aids in treatment planning.

Case Report

A 7-year-old male child reported to private dental clinic, brought by his parents with complaints of pain and sensitivity of teeth and consequent difficulty in eating since 30 days. The patient's medical history included a diagnosis of autism. The family history was non-contributory. He was not on any medications and had no history of drug allergies. The parents reported that the boy had previously undergone extraction of the mandibular primary right first and second molar as it was unrestorable. A limited oral examination was done which revealed smooth surface caries wrt 51, 52, 61 and 62. For analysis of dermatoglyphic pattern, digital hand scan was made by using 1800dpi with Hewlett-Packard Scanjet 4600 scanner. Fingerprint patterns were classified according to the three pattern system- loops, arches and whorls. Loop pattern was more evident on right palm arch (Figure no. 1). Atd angle were measured with image J software system and it was found to be 1.59º. As there was poor cognitive and motor abilities of the child, which made us difficult to manage him on a dental chair. A complete oral rehabilitation was planned under general anesthesia. After obtaining fitness approval from anaesthetist, single visit pulpectomy using zinc oxide eugenol was performed wrt 51, 52, 61 and 62. His postoperative recovery was uneventful. The parents were educated about importance of oral hygiene measures and need for regular dental visits in the future. The patient was reviewed after 6 months, 12 months and again, after 2 years. His parents were satisfied with result.

Figure 1. Legends of Figure- Loop pattern is more evident on right palm arch

DISCUSSION

It has been well documented that skin and brain developed from same ectoderm, so dermatoglyphic markers could give specific information about early brain development disorder in autistic child (Gabriel, Peter, Loevday & Harcourt, 2013). Finger dermatoglyphics and the volar side of the hand developed at the end of first and within second trimester of fetal development, so it seems that during this period brain disorder development can occur. It is considered as a critical period in etiology of autism as well as other neurodevelopment disorders (Avila *et al.*2003). Autism is an incapacitating disturbance of mental and emotional development manifestated by severe deficits in social interaction as well as communication (Gail Williams, Sears & Allard, 2004). Children with autism have multiple medical as well as behavioural problems, resulting in difficulty in dental treatment. The comprehensive management of autism includes parental counselling, special education in a highly structured environment, speech therapy and social skills training, with the aim to facilitate independence in activities of daily living (Monroy & da Fonseca, 2006). There are no specific genetic, medical, or laboratory tests available to confirm the diagnosis of autism. For our patient, full-mouth rehabilitation was planned under general anaesthesia as there was severe delay of motor skills. Children with autism who have mild to moderate mental retardation and an absence of severe behavioural problems can be treated successfully in the general practice setting. In our patient, it was very obvious that it would be difficult for him to comprehend instructions and cooperate on a dental chair, so the treatment was done under general anaesthesia. General anaesthesia provides dental surgeon an opportunity to perform a comprehensive management of all oral findings in a single appointment. Arch and ulnar loops palm were more evident in present case. Arches and loops are consider as simplest form of fingerprint pattern and associated with lower intellectual functioning. Atd angle was measured and found to be 1.59º. Bruin *et al.* (2014) in a study concluded that boys with ASD (Autism spectrum disorder) had a higher rate of discordance in their finger prints (De Bruin & Esther, 2014). Walker described his patient suffering from "a profound inability to relate to people, or establish any positive human contact."Ridge count of both right and left hand were less than normal child (Walker 1977).

Conclusion

Dermatoglyphics is considered as an important indicator for an early diagnosis of infantile autism. It could be used to establish an adequate treatment plan at initial stage. This could help the parents in overcoming the difficulties encountered by the autistic child and educating them at initial level. Dermatoglyphic deviance seems to be specific for severely impaired patients with schizophrenia and mild forms of autism. However, inspection of dermatoglyphics in clinical practice could be used as an additional observation.

Acknowledgement

I take this opportunity to express my profound gratitude and deep regards to my mentor Dr Chandresh Shukla & Dr Ashutosh Dubey M.D.S for their impeccable guidance, monitoring and constant encouragement throughout the formulation of this manuscript. I thank my parents for showering their blessings and love on me, which has provided me with the inspiration and zest to tread through the path of life

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