

Telomere Length and Structured Deep Touch Pressure Therapy in Autism Spectrum Disorder-A Project Synopsis

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Abstract

Autism spectrum disorder is characterised by inability of the child to socially interact with people, poor eye to eye contact, absent or perverted speech, abnormally received sensory stimuli (more or less than optimum response to sensory stimulus), self stimulating, self injurious behaviour, with associated intellectual disability of varying severity, liking for sameness, abnormal stereotactic movements. Hyperactivity and sleep disorders are usually associated, making it difficult for parents to look after the child. Mostly this abnormal behaviour is noticed at the age of 11/2 to 3 years. This is a progressive condition worsening with age.¹

The incidence has been noticed to increase over the years in most parts of world.² The incidence in western world is said to be around 1 in 59 children.³ In India the incidence has been estimated to increase but real prevalence is not known. Many of these children remain undiagnosed and untreated due to difficulty in diagnosis by health care personnel and poor understanding by parents. Two scales developed for Indian children^{4,5} have now made the work easy. Juneja et al found prevalence around 0.9/1000.⁶ This study will test the utility of deep touch pressure therapy on telomere length and development of the child.

Keywords: Deep touch pressure therapy; Autism Spectrum Disorder; Synopsis.

Introduction

Diagnosis is basically clinical. Many screening scoring systems are available for diagnosis of different types in autism spectrum disorder most popular being INCLIN system.⁴ Fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) gives diagnostic criteria making diagnosis easy.⁷ There is no laboratory test which can be used. Though diagnosis has become easy due to scoring systems, it is not easy to treat these children. Multi-model therapy which includes speech therapy, applied behaviour therapy, sensory integration, occupational therapy and parental training has to be used which is difficult for parents to comply with. The response depends

upon the severity of condition, associated features and compliance to therapy.

Therapies which are easy and promising are the need of day. Many modalities are being tried, one modality among those is deep touch pressure therapy (DTP).⁸ It releases endorphins and increased level releases serotonin and dopamine. Serotonin is a neurotransmitter which regulates brain functions which leads to better mood and sleep in these children. Dopamine a hormone also improves mood. DTP in controlled level balances sympathetic and parasympathetic nervous systems which in turn improves smooth regulation of activities, stimulates normal sleep and has calming effect. Increased production of serotonin and dopamine counteracts the activity of corticosteroids which

improves body's response to sensory information.⁹ Studies used different materials or machines for DTP like heavy blankets, hug machine, heavy Jackets and inflated jackets.¹⁰⁻¹² ASD children can be hypersensitive to sensory inputs but in regular DTP desensitization occurs. In this study DTP will be used on special points along the spine and over limbs. The score of ASD will be rechecked at the end of 12 weeks of therapy. Improving scores will be an outcome measure.

The aetiology of ASD is thought to be genetic as well as environmental.¹ Researchers have shown effect on telomere length which is a protective component for chromosomes.¹³ The shortened telomere length has been correlated with severity of illness and mainly found to be associated with social milestones.¹³ Telomere length has been found to be affected in many psychological and behavioural disorders and is correlated with stress.¹⁴ It has been studied in children with ADS and also in parents of ASD children.¹⁵ If found short can be used as prediction of severity and can be used as an indicator of stress. Telomere length can be studied in blood or saliva sample.¹⁵ In this study telomere length will be studied in parents' saliva and blood sample of ASD children.

Aim of study

The study aims to

1. Compare the effect of additional deep touch pressure therapy with traditional multimodel therapy in children with ASD.
2. To correlate telomere shortening in parents and children having ASD with severity of diseases

Objectives

1. To study Telomere length in parents and children with ASD.
2. To compare INCLLEN score in children with autism before and after DTP.
3. To study change in telomere length in children with ASD after 24 weeks of therapy (with /without DTP).

Study design-Case control study.

Study site - Deptt of Pediatrics, JNMC Sawangi (M) Wardha.

Inclusion criteria- Children aged 11/2 years to 16 years diagnosed to have Autism spectrum disorder

based on inclen diagnostic criteria.

Exclusion criteria

1. Children already receiving DTP.
2. Parents not willing to follow scheduled therapy.
3. Denial of consent.

Duration of study - 2 years.

Methods

A 10 point screen will be prepared using inclen criteria for diagnosis of Autism spectrum disorder by health workers. Identified health workers will be trained for it for a duration of one week. These health workers will be using this screen for the children between 11/2 years to 16 years where parents complain of abnormal behaviour or Delayed development ,delayed/absent speech or regression of speech.

Identified children will be brought to the department of paediatrics where they will be again screened using inclen criteria by the investigator and then categorised into types and severity. Their historical and examination details will be recorded in a pretested prevalidated proforma. Their score of inclen will be recorded. Identified children will undergo following investigations.

- a) Telomere length (before treatment) in peripheral blood.
- b) MRI
- c) Telomere length of parents in saliva.

These children will be randomly divided for therapy in following groups.

1. Conventional therapy (multi-model) without DTP.
2. Conventional therapy with DTP .

Patients on DTP will be subdivided into following groups

- a) Twice a week therapy
- b) Thrice a week therapy with a no therapy week between 2 therapy weeks.

Total of 12 weeks of DTP will be given.

All children will be scored again using inclen scoring. Change in score will be recorded. Improved scores in 12 weeks will be noted.

Deep pressure therapy

It will be provided by a trained physiotherapist .A structured programme including number and sites of pressure therapy has been prepared .Two regimens will be followed in randomly divided children as given above .Total of 12 sessions will be conducted.

Outcome measures

1. Decrease in total INCLIN score after DTP .
2. Decrease in INCLIN score in specific areas after DTP.
3. Short telomere length in parents.
4. Short telomere length in children.

Statistical methods

Statistical methods-The data was analysed using SPSS softwas version 21. The frequencies and percentage of various subgroup of donors was calculated .Two groups were compared using using student "t" test. A p value of <0.05 was considered statistically significant.

Conclusion

Autism spectrum disorder is becoming problem due to increasing prevalence,lack of adequate diagnostic techniques and treatment strategy.Right now multimodel therapy is the standard treatment with not a very good outcome. Deep touch pressure therapy is a new technique found to be effective. This project is to test the utility of this technique. Telomere length is found to be short in these children .It will be measured before and after therapy to see whether it changes with improvement. The child will be followed up to assess the development as compared to controls.

Reference

1. Carolyn FB. Autism spectrum disorder. Chapter 54, Nelson textbook of pediatrics .edition 21, eds Kleighman RM, ST Geme ,Beherman R E .pp1725-1748.
2. Kopetz PB, Endowed ED. Autism worldwide: Prevalence, perceptions, acceptance, action. J Soc Sci. 2012;8:196-201.
3. Baio, Jon, et al. "Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years – Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014." *MMWR. Surveillance Summaries*, vol. 67, no. 6, Apr. 2018, pp. 1-23. DOI.org , doi:10.15585/mmwr.ss6706a1.
4. Dalwai S, Ahmed S, Udani V, Mundkur N, Kamath S S , Nair MKC . Consensus statement of the Indian academy of pediatrics on evaluation and management of Autism Spectrum Disorder. *Indian Paediatr*, 2017 ;54: 385-393.
5. Chakraborty, S., Thomas, P., Bhatia, T., Nimgaonkar, V.L., & Deshpande, S.N. (2015). Assessment of severity of autism using the Indian scale for assessment of autism. *Indian Journal of Psychological Medicine*, 37, 169.
6. Juneja M, Mishra D, Russell PS, Gulati S, Deshmukh V, Tudu P, Sagar R, Silberberg D, Bhutani VK, Pinto JM, Durkin M, Pandey RM, Nair MK, Arora NK INCLIN Diagnostic Tool for Autism Spectrum Disorder (INDT-ASD): development and validation. *Indian Pediatr*. 2014 May; 51(5):359-65
7. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edition. Arlington, VA: American Psychiatric Association; 2013.
8. Chen, Hsin-Yung. "[No Title Found]." *Journal of Medical and Biological Engineering*, vol. 33, no. 5, 2013, p. 463. DOI.org (Crossref), doi:10.5405/jmbe.1043
9. Exploring the Safety and Therapeutic Effects of Deep Pressure Stimulation Using a Weighted Blanket. Brian Mullen BS , Tina Champagne MEd, OTR/L , Sundar Krishnamurty PhD , Debra Dickson APRN, BC & Robert X. Gao J of occupational Therapy in Mental Health Volume 24, 2008 - Issue 1.
10. Losinski, Mickey, et al. "Examining the Use of Deep Touch Pressure to Improve the Educational Performance of Students With Disabilities: A Meta-Analysis." *Research and Practice for Persons with Severe Disabilities*, vol. 41, no. 1, Mar. 2016, pp. 3-18. DOI.org (Crossref), doi:10.1177/1540796915624889
11. Sensory-Based Intervention for Children with Behavioral Problems: A Systematic Review. Wan Yunus F, Liu KP, Bissett M, Penkala S.J *Autism Dev Disord*. 2015 Nov; 45(11):3565-79.
12. Zongchang Li, Jinsong Tang, Hong Li, Shan Chen, Ying He, Yanhui Liao, Zhen Wei, Guobin Wan, Xi Xiang, Kun Xia, Xiaogang Chen. Shorter telomere length in peripheral blood leukocytes is associated with childhood autism. *Sci Rep*. 2014; 4: 7073. Published online 2014 Nov 17. doi: 10.1038/srep07073.
13. Fernandez-Egea E. et al. Telomere length and pulse pressure in newly diagnosed, antipsychotic-naïve patients with nonaffective psychosis. *Schizophr. Bull*. 35, 437-442 (2009).
14. Nelson, Charles A., et al. "Shortened Telomeres in Families With a Propensity to Autism." *Journal of the American Academy of Child & Adolescent Psychiatry*, vol. 54, no. 7, July 2015, pp. 588-94. DOI.org (Crossref), doi:10.1016/j.jaac.2015.04.006.