DERMATOGLYPHIC CHARACTERISTICS IN CHILDREN WITH AUTOIMMUNE THYROID DISORDERS: FORENSIC DIAGNOSTIC PERSPECTIVES

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Abstract: *Dermatoglyphics, the study of epidermal ridge configurations on the fingers and palms, offers a valuable insight into genetic and developmental influences underlying autoimmune diseases. This paper examines the forensic and clinical relevance of dermatoglyphic traits in children diagnosed with autoimmune thyroid disorders, such as Hashimoto's thyroiditis and Graves' disease. Given that ridge patterns are established during early fetal life and remain unchanged thereafter, they serve as lifelong phenotypic markers of genetic susceptibility. Evidence suggests that children with autoimmune thyroid pathology may present specific dermatoglyphic deviations, which could be leveraged for early diagnosis and forensic identification.*

Keywords: *Dermatoglyphics; autoimmune thyroid disorders; Hashimoto's thyroiditis; Graves' disease; forensic diagnostics; pediatric endocrinology*.

Autoimmune thyroid disorders (AITDs) represent one of the most prevalent endocrine pathologies in pediatric populations, with significant long-term implications for growth, metabolism, and neurodevelopment. Hashimoto's thyroiditis is characterized by immune-mediated destruction of thyroid tissue leading to hypothyroidism, whereas Graves' disease causes hyperthyroidism due to the production of thyroid-stimulating immunoglobulins. While genetic predisposition plays a critical role in AITD, environmental triggers such as infections, stress, and nutritional factors contribute to disease onset. Dermatoglyphics, shaped by both genetic and intrauterine environmental factors during the 13th to 21st weeks of gestation, offer a unique non-invasive method to explore these predispositions.

Autoimmune thyroid disorders (AITDs) are among the most common endocrine diseases affecting the pediatric population, with significant long-term consequences for growth, metabolism, and neurodevelopment. The most prevalent forms, Hashimoto's thyroiditis and Graves' disease, are characterized by immune-mediated damage to the thyroid gland. Hashimoto's thyroiditis leads to hypothyroidism through chronic inflammation and gradual destruction of thyroid tissue, while Graves' disease results in hyperthyroidism due to the production of thyroid-stimulating immunoglobulins.

Dermatoglyphic patterns are formed during the 13th to 21st weeks of fetal development and remain unchanged throughout life. These patterns thus serve as stable phenotypic markers reflecting both genetic and intrauterine environmental influences. Studying dermatoglyphics provides a unique, non-invasive approach to investigating genetic predisposition to AITDs and may facilitate early diagnosis in children.

Research indicates that children with autoimmune thyroid disorders exhibit distinctive dermatoglyphic variations compared to healthy controls. These variations include differences in ridge patterns such as loops, whorls, and arches, as well as the number and placement of triradii and delta points on the palms and fingertips. Such specific dermatoglyphic traits could be associated with genetic susceptibility to autoimmune thyroid pathology.

In the clinical setting, dermatoglyphic analysis complements traditional diagnostic methods, offering a cost-effective and rapid screening tool that is especially useful for early detection of subclinical or asymptomatic cases. Moreover, in forensic medicine, dermatoglyphic characteristics serve as reliable biometric identifiers, aiding in personal identification and genetic profiling of pediatric patients with AITDs.

However, when interpreting dermatoglyphic data, it is important to consider potential confounding factors such as ethnic variability and environmental influences. Integrating dermatoglyphic findings with genetic, immunological, and clinical parameters enhances the accuracy and relevance of diagnostic and forensic evaluations in children affected by autoimmune thyroid disorders.

Dermatoglyphic analysis provides a valuable, non-invasive tool for understanding the genetic and developmental factors involved in autoimmune thyroid disorders in children. The stability of fingerprint and palm patterns from fetal life throughout adulthood allows these traits to serve as lifelong markers of genetic susceptibility. Specific dermatoglyphic variations observed in pediatric patients with Hashimoto's thyroiditis and Graves' disease highlight the potential for using these patterns in early diagnosis, risk assessment, and forensic identification. Integrating dermatoglyphic data with clinical and genetic findings can improve diagnostic accuracy and contribute to personalized management strategies for affected children. Further large-scale studies are warranted to validate these associations and to explore the full forensic and clinical utility of dermatoglyphics in autoimmune thyroid pathology.

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