

# Evaluation of Dermatoglyphic Patterns in Chronic Periodontitis Patients

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ABSTRACT

**Aim:** The aim of the present study was to analyze the palmar dermatoglyphic patterns of chronic periodontitis patients and to find any correlation between them. **Materials and Methods:** A total of 80 patients were included in the study. Group I: Healthy group, 40 patients with no clinical and radiographical periodontal involvement. Group II: Chronic periodontitis patients with 30% sites exhibiting 5 mm clinical attachment level (CAL). Patients with systemic diseases were excluded from the study. **Results:** There was a significantly higher percentage of whorls in Group II compared to Group I. Loop patterns are significantly more in Group I than Group II. There was no significant difference between both the groups for arch patterns. **Conclusion:** There can be a correlation between the dermatoglyphic pattern and the chronic periodontitis as whorl finger pattern predominates in chronic periodontitis patients.

**KEYWORDS:** Aggressive periodontitis, chronic periodontitis, dermatoglyphics

## INTRODUCTION

For centuries, the features of hands have fascinated scholars, sages, doctors, and even layman alike. The scientific research showed that hand can be recognized as a powerful tool for the diagnosis of psychological, medical, and various genetic conditions. Dermatoglyphics was first coined by Cummins in 1926, which refers to the study of dermatoglyphics – a natural covering in the skin and the patterns of the surface of the hands and feet.<sup>[1]</sup>

Dermatoglyphics is the dermal ridge configuration on the digits, palms, and soles. Dermatoglyphic patterns are genetically determined and can be considered as a window of congenital and intrauterine abnormalities. In dentistry, it has been studied to predict disorders such as dental caries,<sup>[2]</sup> malocclusion, congenital abnormalities such as gingival fibromatosis,<sup>[3]</sup> and periodontitis. The development of enamel and the finger buds both begins in the 6<sup>th</sup> week of intrauterine life, and hence, any dermatoglyphics can be used to predict the oral and dental diseases. There are three types of ridge patterns such as arches, loops, and whorls.<sup>[4]</sup> Arch is formed by succession of parallel ridges which pass through the area and forms a concave curve in the proximal area. Loops

are the most common patterns and are formed the entry of a series of ridges into the pattern area within the same side. Whorls are formed by two or more confluence of ridges.<sup>[5]</sup>

Chronic periodontitis is an infectious disease resulting in inflammation within the supporting tissues of the teeth, progressive attachment, and bone loss and is characterized by pocket formation and/or gingival recession. It is recognized as the most frequently occurring form of periodontitis and is prevalent in adults. There are several etiological factors which attribute to the disease onset and progression, including genetics. Since the recent diagnostic methods used to determine the genetic basis of periodontitis are expensive and techniques sensitive, dermatoglyphics has been used to alleviate this predicament.<sup>[6]</sup>

The present study was done to conform the hypothesis that a prenatal event such as dermal ridge formation can be a predictor for periodontitis. Studies done

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earlier support that finger pattern is linked with chronic periodontitis which can be a valuable, noninvasive, and lucrative tool for early recognition of periodontitis.<sup>[7]</sup> Hence, the aim of the present study was to analyze the palmar dermatoglyphic patterns of chronic periodontitis patients and to find any correlation between them.

## MATERIALS AND METHODS

The present was conducted in the Outpatient Department of Periodontics, JKKN Dental College and Hospital, Komarapalayam. The participants were explained about the study, and informed consent was obtained. The study was approved by the Institutional Ethical Committee. A total of 80 patients with mean age of 30–60 years were included in the study. Patients with systemic diseases were excluded from the study.

Group I (control group): 40 patients with at least 20 teeth with periodontally healthy sites and no history of periodontal treatment. Group II (test group): 40 patients with chronic periodontitis with at least 20 teeth and more than 30% of sites exhibiting 5 mm of mean clinical attachment loss.

### Collection of fingerprints

All the participants were asked to wash their hands with soap to remove all the dirt. Then, the fingertip patterns of each participant were recorded using standard ink method, using blue duplicating ink, thick white printing paper, and sponge pad as shown in Figure 1. The fingerprints obtained using this method were studied with the help of magnifying glass. For each individual, the fingerprints were recorded from the right hand. The fingerprint patterns were then categorized to loops, whorls, and arches as shown in Figure 2, respectively.



Figure 1: Fingerprint assessment

## RESULTS

When the fingertip patterns of patients were compared, there was a significantly higher percentage of whorls in Group II compared to Group I [Figure 3, Table 1 and Graph 1]. Loop patterns are significantly more in Group I than Group II [Figure 2, Table 1 and Graph 2]. There was no significant difference between both the groups for arch patterns [Figure 4, Table 1 and Graph 3].

## DISCUSSION

Periodontitis is one of the most widespread dental diseases and is associated with several factors such as environmental, systemic, and genetic factors. Periodontitis is a multifactorial disease but might have specific genetic background. The dermal ridges have notable characteristics which make them important for various identification and diagnostic procedures.<sup>[8]</sup> Dermatoglyphics is a genetic test method suggesting the modes of inheritance of hereditary diseases.

The present study was conducted with the aim to determine a finger pattern type associated with chronic periodontitis. Unlike many bodily tracts, the dermal ridges and configurations once formed remain unchanged and are age and environmental stable.<sup>[9]</sup>

In the present study, 400 fingerprints were analyzed. Forty patients in each Group I and Group II, and for each patient, five fingerprints were taken. It was found that increased frequency of whorls (89) in Group II patients

Table 1: The relationship between dermatoglyphics and chronic periodontitis

Types	Group I	Group II
Loops	154	104
Whorls	41	89
Arches	5	7



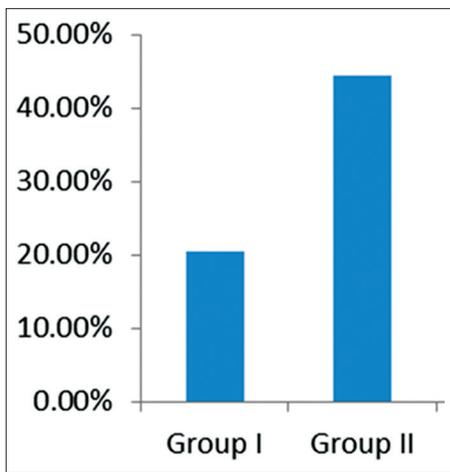
Figure 2: Loop pattern



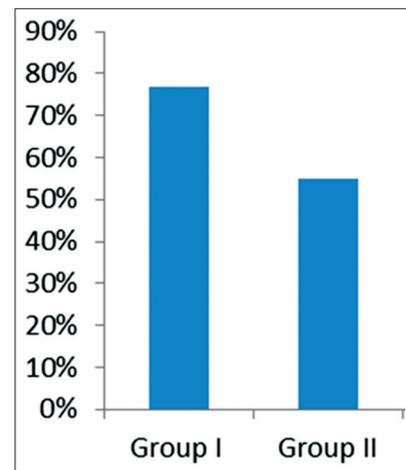
Figure 3: Whorl pattern



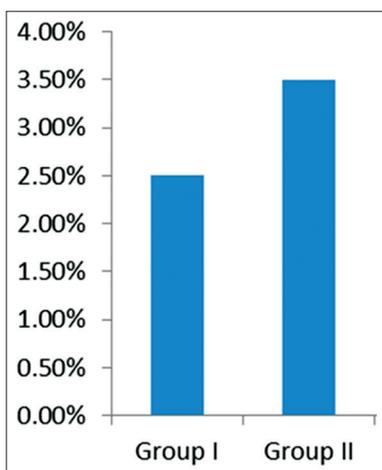
Figure 4: Arch pattern



Graph 1: Percentage comparison of loops pattern between group I and group II



Graph 2: Percentage comparison of whorls pattern between group I and group II



Graph 3: Percentage comparison of Arches pattern between group I and group II

and (41) in Group I patients. There was 20% increase in whorl pattern in Group II compared to Group I. This was in accordance with Atasu *et al.* 2005,<sup>[6]</sup> who found that

there were increased frequencies of concentric whorls and transversal ulnar loops on all fingers of the patients with adult periodontitis.

In our present study, Group II showed less number of loops (104) compared to Group I (154). There was 35% increase in Group I compared to Group II. This was in accordance with Kochhar *et al.*<sup>[10]</sup> who found less number of loops in patients with high oral hygienic index, and patients prone to periodontitis will have lower number of loops compared to healthy controls.

### CONCLUSION

Thus, the present study proves that dermatoglyphics can be used as a powerful tool for early diagnosis, treatment, and better prevention of chronic periodontitis. From the present study, it was found that there was a strong association between fingerprint patterns and chronic periodontitis. Thus, the

assessment revealed an increased frequency of whorls and decreased frequency of loops of patients with chronic periodontitis.

However, further studies with larger sample size are required to prove the correlation of dermatoglyphic patterns and chronic periodontitis.

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#### Conflicts of interest

There are no conflicts of interest.

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