Rare Patterns of Finger and Palm Prints in Anorexia Nervosa
An Exploratory Dermatoglyphic Study *

Israel Oron (Ostre), Ph.D., Consulting Psychologist
Rachel Bachner-Melman, Ph.D., Clinical psychologist, Eating Disorders Unit, Adult Psychiatric Ward, Hadassah University Medical Center, Jerusalem, Israel

Introduction
It is well known that in anorexia nervosa (AN), relapse and mortality rates are extremely high, but that early diagnosis and treatment generally leads to good prognosis. With that in mind, and because of the clear genetic contribution to anorexia, we studied whether women diagnosed with AN are characterized by distinctive finger and palm prints.

What is the rationale for this approach?
First, the rather odd word of dermatoglyphics means literally skin carving. It is the scientific study of the ridges and creases on fingers and palms (toes and soles), and a branch of physical anthropology, medicine and genetics.

The interest in the fine ridges and creases is probably as old as humanity itself, but dermatoglyphics is far removed from the popular image of fortune-tellers uttering mysterious incantations in an arcane language. It is generally accepted that the scientific study began in 1823 with the thesis of the Czech biologist Joannes Evangelista Purkinje. He was the first to systematically classify the varieties of patterns of the fingers. This important scientific landmark was followed by the publication in 1892 of Francis Galton's "Finger Prints", a volume that dealt with morphology, classification, inheritance and racial variation. The work of the anatomists Harold Cummins and Charles Midlo also constitute a milestone since they organized all the material on the subject available at that time and contributed a substantial number of studies of their own (Cummins and Midlo, 1943/1961).

Finger and palm prints are comprised of a large number of dermatoglyphic configurations. Anthropological studies indicate that the vast majority of all human beings are characterized by the same frequent mode of configurations. However, a few people have other kinds of configurations that are infrequent, and at times rare. Decades of scientific research have shown that these rare configurations are

*Paper presented at the 19th International Conference on ED. Alpbach, Austria, October 2011.
associated with specific medical disorders such as chromosomal aberrations (Stocker et al, 2001), diabetes (Ziegler et al, 1993) and childhood leukemia (Purvis-Smith et al, 1973), and with psychological problems including psychosis (Rosa et al, 2000), mental retardation (Vashist et al, 2010) and hypertension (Floris et al, 1998). This motivated us to inquire whether such an association can be demonstrated in anorexia as well.

The Study
The purpose of the study (conducted in 2010) was to lay the groundwork for a dermatoglyphic tool that screens populations at risk for AN; specifically we enquired whether the dermatoglyphics of women with AN differ from those in healthy groups. Sample: Twelve Israeli women aged 22-31 with a current or past DSM-IV diagnosis of AN in various stages of illness or recovery. AN diagnosis was determined by the second author. Participants provided 120 fingerprints and 24 palmprints in total that were obtained and analyzed by the first author.

Results
We observed three unusual fingerprint patterns and five uncommon palmprint features in the research group, compared to the healthy controls.

Fingers: Figure 1 shows the three common (or frequent) patterns located on the tips of the fingers. The green arrows (on the right) mark the ridges on the skin. Ridges form patterns. The pattern of the whorl, for example, is made up of circular ridges. The blue arrow (on the left) points to a tri-radius.

Figure 1: Common Patterns on Fingers
Tri-radius: The meeting point of three opposing ridge systems, that form a Y shape.
The rare patterns found in the research group are shown in Figure 2. There are deviations from each of the common patterns. On the left side there is a small whorl (in green) located within a loop (marked in blue), next is a pattern of two loops, and finally an arch that resembles a tent. (The red arrow points to the "pole" of the tent).

![Figure 2: Rare Patterns Found on AN Fingers](image)

The three deviations were more frequent in the research group than in the two control groups (Figure 3). The histogram represents the frequency of the rare patterns in the research group (in green) and in the control groups. The significance level is indicated above each histogram. (Frequencies of the rare patterns were compared to healthy female groups as published in the literature).

![Figure 3: Rare Patterns: AN vs. Controls](image)
**Palms:** Usually on the palm there are five triradii (Figure 4): four digital triradii (marked: a, b, c, and d) and an axial triradius (marked by the letter: t).

Figure 4:

![Common Tri-radii on Palms](image)

Figure 5 illustrates three deviations from the norm. On the palm on the right side the red arrow points to triradius C which is missing in some palms in the research group. The second deviation: the axial triradius "shifted", so to speak, to a distal position (marked by the green arrow). The third deviation: the axial tiradius is missing altogether.

Figure 5:

![Rare Tri-radii Found on AN palms](image)
On the left side of the figure, two of these deviations are shown on two palms taken from the research group. In the upper example the positions of only the three remaining digital triradii a, b, and d are marked by red circles. In the lower example a red circle marks the distal position of triradius t. The comparison with the controls is presented in Figure 6. (As to the histogram of the missing axial triradius – none was found in the controls).

On the palm there are three primary creases (Figure 7). These three creases have two points of origin - an ulnar for the distal transverse crease (see the right edge of the palm), and (at the left edge) a common radial point for the proximal and the radial creases. In addition, on the palm there are secondary creases - numerous short creases, which are distributed all over the palm.
Figure 8 shows two crease deviations. There are separate points of origin for the proximal and the radial creases instead of one (shown in a palm from the research group, on the left side). The second deviation is made up of closely packed secondary creases which cover the palm like a curtain, obscuring any other features beneath.

Figure 8:

![Rare Creases Found on AN palms](image)

1. Separate radial starting points:
2. High density of secondary creases

In comparing the results with healthy females (Figure 9) it was found that in one of the control groups the separate radial points of origin was not found at all, and the high density of secondary creases was missing from both of the controls.

Figure 9:

![Rare Creases: AN vs. Controls](image)
**Conclusions**

This psychobiological study is exploratory since no previous research has examined dermatoglyphic configurations of individuals with AN. The results constitute a promising basis for future studies that will examine other possible rare features in AN females, and suggest that a dermatoglyphic tool constructed from all of these features may have discriminatory power to identify vulnerability to AN. Such a tool, when established and validated, should be used in screening populations at risk, in particular in early childhood, to monitor for early onset symptoms. If such individuals could be closely monitored, encouraged to participate in prevention programs and/or therapeutic interventions, years or decades of suffering, and even premature death may be prevented.

**Acknowledgement**

We extend our sincere appreciation to all the participants for their cooperation in providing finger and palm prints.

**References**


