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Letter to Editor

DERMATOGLYPHICS PATTERNS ABNORMALITIES AS PUTATIVE MARKERS OF PSYCHOMETRIC-RISK FOR SCHIZOPHRENIA

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Dear editor,

It is commonly theorized that schizophrenia (SZ) stems from neurodevelopmental disruption arising from interactions between genetic risk factors and environmental insults. This process is expressed across a dynamic continuum of related psychotic manifestations, ranging from high-risk state for psychosis to schizotypy to full-blown clinical SZ. In line with this model, identifying reliable phenotypic markers of attenuated forms of SZ is an important issue as a significant proportion of these patients will go on develop full-blown SZ in a short period (Cannon 2008). Notably, it has been ascertained that patients with SZ display significant dermatoglyphic patterns abnormalities compared to healthy controls in a recent meta-analysis (Golembo-Smith et al. 2012). Dermatoglyphics are epidermal lines of the skin that can be observed on fingers and handprints. Dermatoglyphics abnormalities (DA) are thought to be underpinned by both genetics and environmental prenatal contributors to vulnerability for psychosis (i.e. prenatal maternal infections, stress experiences) that disrupt the embryo's ectodermal tissue from which develop both the epidermis and brain structures that are impaired in SZ (King 2009). Dermatoglyphics measures show many advantages as they can be performed in a non-invasive, inexpensive and quickly fashion, they are not prone to recall bias and provide continuous data.

However, in order to stand as a reliable marker of risk for SZ, DA should be present at all psychosis continuum stages that are thought to be etiologically related to SZ, such as high-risk state for psychosis and schizotypy. Furthermore, relevant biomarkers for early stages of SZ are still missing. To better demonstrate the value of DA as a marker for these attenuated forms of SZ and see if DA hold along a clinical continuum of psychotic manifestations, we conducted a systematic review of the PubMed database using the following headings: (Dermatoglyphic*) AND (Psychos* OR Schizotyp* OR Prodrom*). The criteria for inclusion were: (i) patients with psychometrically-identified high-risk state for psychosis and schizotypy, (ii) dermatoglyphic measures, (iii) comparison with healthy controls.

The search returned 41 records from which 9 plus 1 from citation lists were reviewed. Extracted data are provided in Table. Two main types of dermatoglyphics measures were conducted: counts of various dermatoglyphic features and degree of fluctuating dermatoglyphic asymmetry (the absolute difference of dermatoglyphic features between counts of left and right hand). A higher degree of dermatoglyphic asymmetry was observed in subjects with ultra high risk of SZ (Russak et al. 2016, Mittal et al. 2012). Results provided for patients with schizotypy remain heterogeneous, with only few studies showing overall significant differences in dermatoglyphic features bet samples (Weinstein et al. 1999, Chok et al. 2005, Chok & Kwapil 2005). However, "negative forms" of schizotypy with higher levels of physical and social anhedonia show a strong tendency to exhibit more DA than other clinical presentations of the disease (Barrantes-Vidal et al. 2003, Rosa et al. 2004, Chok et al. 2005), which is consistent with the higher association of negative symptoms with global developmental deviance (van Os et al. 1998). Significant differences between controls and schizotypy may be gender-related, likely related to sex differences seen in psychosis and neurodevelopment (Daly et al. 2008). Interestingly, there was no significant difference between schizotypy and conduct disorder/other personality disorder, which raises the hypothesis that neurodevelopmental disruption is also implicated in such disorders (Weinstein et al. 1999) (Table 1).

Our review helps to delineate DA as a potentially reliable marker of psychometric-risk for SZ, although large samples studies are still required to use such measure as diagnostics. We encourage the measure of dermatoglyphics patterns in predisposed sample to detect at-risk subjects for SZ and help reducing the duration of untreated psychosis, especially in cases with high anhedonic symptoms. Finally, we think DA show relevance to better elucidate etiological processes involved in SZ-spectrum.

Table 1. Summary of studies comparing dermatoglyphic features between predisposed samples for schizophrenia and controls

Study	Stage	Measure of psychotic symptoms	Sample	Dermatoglyphics measures	Findings
Studies comparing degree of fluctuating dermatoglyphic asymmetry					
Russak et al. 2016	HR	SCID-P, SIPS	51 PS, 45 controls	TFRC	HR > C
Mittal et al. 2012	HR	PQ-B	16 PS, 205 controls	TFRC	HR > C
Daly et al. 2008	schizotypy	PAS, MIS, SAS, PhAS	106 'social anhedonia' SzP, 230 controls	atd	SzP female < C female, No significant difference between SzP male and C male
Chok et al. 2005	schizotypy	PAS, MIS	51 SzP, 63 controls	a-b, atd, TFRC,	No significant difference between C and SzP
Rosa et al. 2004	schizotypy	PAS, PhAS, SAS	260 randomly selected students	a-b	FA associated with 'negative' SzP
Weinstein et al. 1999	schizotypy	SCID-P	19 SzP, 19 conduct disorder or other P disorder, 26 controls	TFRC	SzP > C No significant difference between O and SzP
Studies comparing counts of dermatoglyphic features					
Daly et al. 2008	schizotypy	PAS, MIS, SAS, PhAS	106 'social anhedonia' SzP, 230 controls	a-b TRFC, ET	SzP male < C male, no significant difference between SzP female and C female, no significant difference between SzP total and C total No significant differenced between SzP and C
Chok & Kwapil 2005	schizotypy	PAS, MIS, SAS, PhAS	197 SzP, 135 controls	ET	SzP > C, 'negative' SzP > 'positive' SzP
Langsley et al. 2005	HR	PSE	55 PS, 26 controls	arches, radial and ulnar loops whorls, pattern complexity (whorls minus arches)	HR > C, p-value not provided HR < C, p-value not provided
Chok et al. 2005	schizotypy	PAS, MIS	51 SzP, 63 controls	whorl, TFRC loop a-b, atd, arches	SzP < C SzP > C No significant difference between C and SzP
Barrantes Vidal et al., 2003	schizotypy	PAS, SAS, PhAS	36 'negative' SzP, 56 'high' SzP 67 'positive' SzP, 108 controls	a-b	'negative' SzP > C No significant differences between C and 'high' or 'positive' SzP
Fañanás et al. 1996	schizotypy	PAS, SAS	A pair of 13 y.o. female MZ twins discordant for SzP	rd TFRC	SzP twin > C twin SzP twin < C twin

- **Subjects**: HR = high-risk state for psychosis, SzP = schizotypy, C = controls.
- **Psychometric Scales**: MIS = Magical Ideation Scale, PAS = Perceptual Aberration Scale, PhAS = Physical Anhedonia Scale, PQ-B = Prodromal Questionnaire – Brief Version, PSE = Present State Examination, SAS = Social Anhedonia Scale, SCID-P = Structured Clinical Interview for DSM Disorders (Patient Edition), SIPS = Structured Interview for Prodromal Syndromes.
- **Clinical form of schizotypy**: 'high SzP' = SAS score > PhAS score, 'negative SzP' = PhAS or SAS score > PAS score, 'social anhedonia' SzP: SAS score > +2 SD, 'positive SzP' = PAS score > SAS or PhAS score.
- **Dermatoglyphic measures**: a-b = palmar a–b ridge count: number of ridges that cross the line drawn between the meeting point of three ridges (called a triradius) at the base of the index (triradius 'a') and major (triradius 'b') fingers, atd = atd angle: angle formed by lines drawn from triradius 'a' to triradius 't', the most distal axial triradius near the base of the palm, TFRC = total finger ridge count: total number of ridge that cross the line drawn between the triradius of the finger print and its corresponding core of the finger pattern, for all 10 fingers, ET = extralimital triradii the finger tip's triradius is absent or not visible because it does not fit on the ridged area of the finger tip, rd = ridge dissociation: short broken and disorganized segments of lines that cover the palmar pattern.

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