Filling the Gap: on the New Micro-toponomic Phenomena and Partial Topologies

Lepota L. Cosmo[1]*

[1] Independent Researcher, American Association for the Advancement of Science, Washington, USA

Email Address

lepota.cosmo@com (Lepota L. Cosmo)
*Correspondence: lepota.cosmo@com

Received: 20 November 2017**; Accepted:** 11 Decemebr 2017**; Published:** 16 January 2018

Abstract:

Topology is in a certain sense secondary if interpreted as a repercussion of internal status, that is as a dynamic and static consequence, especially, secondary to the other two types of surficial sciences: surficial osal anatomy and surficial muscular anatomy. The way the osal anatomy forms the muscular anatomy, both previous anatomies, form the third anatomy, the outer surficial anatomy of the body. Topology dynamics is complex and multilayered, as it involves the at least two internal dynamics mentioned here, as well as their interaction. The paper deals with the systematic problems of surface anatomy, first of all, in relation to a certain number of external surficial phenomena, focusing boldly on folds, metacarpal, substernal and rectusal shallow systems.

Keywords:

Dynamics, Superficial Anatomy, Creases, Substernal Fossa, Rectusal Fossae, Micro-topology

1. Introduction

Surface anatomy is rellativly young science, a science that has concentrated its research on the research of external anatomy of the bones, while in recent years also certain specific phenomena of surface anatomy, surface dynamics and surface anatomy of the skin, such as wrinkles and skin lines, are also somewhat more detailed in the relations between muscular landscapes and external, therefore non muscular, outward, surface anatomy [1]. Topology is in a certain sense secondary if it is interpreted as a repercussion of internal status, that is, as a dynamic and static consequence, especially secondary to the other two types of surfacail science, surficial osal anatomy and surficial muscular anatomy. The way the osal anatomy forms the muscular anatomy, both previous anatomies, form the third anatomy, the outer surficial anatomy of the body [2]. Topology dynamics is complex and multilayered, as it involves the at least two internal dynamics, mentioned here as well as their interaction. The dynamics of surficial topology is in itself the

most refined, and most complex in relation to its substructure, muscular, but not only muscular, dynamic, nature. To emphasize here only the facial anatomy, the most complex topology and the most complex dynamic interpretation of all given topologies. Surface anatomy should be approached as an autonomous complex, investigated independently, but also in the connection with previous topologies, as its active consequence. At this point, there is hardly any book or monographic publications on the anatomy, as understood here (as secondary surficial structure), there is also no comprehensive systematization of all surficial phenomena, there is, what can be called, partial systematization, one can speak of topological partitions, such as facial topology [3], hand topology [4] as well as other possible topologies, however, there is always a lack of insight in the area of all partial topologies, in the case of hand topology, internal but not external. Then topography of rectus and substernum, as well as other topologies and dynamics, in order to form a complete, systematic topology. Special attention should be given to surface dynamics, which, unlike all other areas of research, is the most complex and demanding. Surface dynamics is an area that still needs to experience its ingenious flair.

Surface dynamics is still unexplored, and certainly must have its own framework, especially in the dynamics of complex structures. All muscles are shown as a very complex structure of surface repercussions, dynamism is often unpredictably. In complex structures we do not know the product in terms of interaction and great possibility of combinations. For this purpose author use here the term original dynamics, for example, the facial dynamics, but also of any other combined or interactive dynamics. The product of interactive dynamics is highly complex for one surficial typology, or typological classification. In terms of dynamism, there is no only one but an original anatomy (speaking primarily about active anatomy). Every anatomy is in a certain sense elusive, with regard to the interactive results. We do not yet know how much forms can encompass human face; human face is a reflection of the endless number of external forms; the face is a semi-perfect surface, almost perfect topology.

The facial dynamism, as one of the examples of dynamics (however, this problem is present in all other dynamisms) poses a great problem for science and the scientific method, first of all in relation to the professional nomenclature in the case of an assumed anatomy, since it is dynamic the product is always different, that is, the original dynamically interpretive anatomy.

We shall leave a dynamic structure aside, and deal with the systemic problems of surface anatomy, first of all, in relation to a certain number of external surficial phenomena. In a certain sense, surface topology has already been structured. Paper will try to fill some of the gaps in the nomenclature of surface anatomies, highlighting the work of certain researchers in this field and their contributions.

2. Materials and Methods

The field of research is the existing research results of surface anatomy, in its data, according to partial surface anatomies, or secondary partial topologies, as in the case of facial, manual or dynamic anatomy. The work use original contributions and nomenclatures [5][6] striving to emphasize and support the integrity of a formal scientific surficial system. The composition of the research is divided into three lines: i) the partial surface anatomy of the hand, ii) the structure of rectal anatomy and

the research experience of surface anatomy of the sternum, iii) and finally, to certain surface products, individual toponomies, which do not occur in a greater number of cases.

The researcher uses the observational technique of insight. Observation is realized on the existing number of research results in the area of surface anatomy. The work includes the results of palpable research, with the integrity of dynamic results. The observational method is used in correlation with the palpable method in order to establish interactions of primary and secondary surficial anatomy [7].

For example IFSSH [1] uses the following classification of the skin creases: The skin creases ("joints" of the digital and palmar skin) are listed in the different languages on FASCIA and APONEUROSIS. Palmar creases. In the palm there are three longitudinal and two transverse creases. The longitudinal creases are the thenar, the central and the hypothenar. The most constant and easily differentiated is the thenar crease, due to the wide mobility of the carpo-metacarpal joint of the thumb. The central and hypothenar creases are the reflection of the mobility at the carpometacarpal joints of the ring and small fingers. The two transverse creases are the proximal and the distal. The distal crease starts at the u1nar side of the hand and finishes in between the middle and index fingers, as most of the hand functions are done with the ulnar fingers in flexion for power grasp, while the index and the thumb remain in extension for precision manipulation. The middle finger can either help the thumb and index for manipulation, or the ring and small fingers if more power grasp is needed. The proximal crease starts at the radial side of the hand along with the longitudinal thenar crease. Flexion of themetacarpo-phalangeal joints takes place in a transverse line between the origin of the distal palwarcrease on the ulnar side and the proximal palmar crease on the radial side. Individuals with Down'ssyndrome just have one transverse palmar crease. Digital creases. Usually there are two creases at the level of each joint, theproximal one. The palmar digital crease of the triphalangeal fingers is usually located at theproximal third of the proximal phalanx. The palmar digital crease of the thumb is longitudinally oriented and slightly proximal to the metacarpo-phalangeal joint.

IFSSH SC Report in Chapter 1 on Anatomy discerns 1.1. General Terms, 1.2. Bones, 1.3. Joints, 1.4. Muscles, 1.5. Tendons, 1.6. Fascia and Aponeurosis, 1.7. Nerves, 1.8. Vessels, 1.9. Skin and Accessories. Subchapter 1.9. as in table:

Table 1. *IFFSH Report. Subchapter 1.9 Skin ans accessories*

Cutis	Epidermis	Corium, dermis	Cristae cutis	Tela subcutanea
Skin	Epidermis	Dermis	Rugae	Subcutaneos tissue Finger prints
Sulci cutis	Linea carpi palmaris: proximali s et distali s	Sulcus longitudina listenaris, lateralis	Sulcus lon gitudialis medianus, intermediu s	Sulcus longit udinalishypot henaris

Skin creases	Wrest creases: proximal and distal	Longitudinal thenar crease	Longitudinal median crease	Longitudinal hypothenar crease
Sulcus transversalis	Radialis	Sulcus transversalis ulnaris	Unguis	Matrix unguis
Proximal palmar	Distal palmar	Proximal digital Proximal interophalangeal Joint crease Dystal interphalangeal joint crease	Nail	Nail matrix
Lectulus, Salum unguis	Lunula	Margo liber	Perionyx	Eponychium
Nail bed	Lunula	Free margin	Nail wall	Cuticle

3. Results and Discussion

Tendinous intersections and linea alba form round, pot like depressions superior to umbilicus, rectus fosae, rectusal hallows, (primo et secundo et tertium). The hollow wider and superior to fosae could keep water (mannerly aquae vitae) as topographic cup. Substernal triangle, surface pendant of xhipoid process, of pectoralis major, costal, rectus abdominis and sternum, form substernal fossa, or calix, and as to rectus fossae sequences of tendinous intersections[8].

The tendinous intersections define the anatomy of the rectus abdominis and assist with physiological movement. If the rectus abdominis did not have tendinous intersections, there would be one large muscle group on each side of the linea alba. This large muscle group would allow the vertebral column to flex forward, but would not permit a large extent of forward flexion. [9]

The rectus abdominis muscle, also known as the "abdominals" or "abs", is a paired muscle running vertically on each side of the anterior wall of the human abdomen, as well as that of some other mammals. There are two parallel muscles, separated by a midline band of connective tissue called the linea alba. It extends from the pubic symphysis, pubic crest and pubic tubercle inferiorly, to the xiphoid process and costal cartilages of ribs V to VII superiorly [10]. The proximal attachments are the pubic crest and the pubic symphysis. It attaches distally at the costal cartilages of ribs 5-7 and the xiphoid process of the sternum.

The rectus abdominis muscle is contained in the rectus sheath, which consists of the aponeuroses of the lateral abdominal muscles. Bands of connective tissue called the tendinous intersections traverse the rectus abdominus, which separates this parallel muscle into distinct muscle bellies. The outer, most lateral line, defining the "abs" is the linea semilunaris.

One should make diffrence between sacral dimples, sacral triangle, pilonidal dimples, and phenomenon of coccygeal fossa (located within interglueteal, fessura interglutea as slight depression, pot or olla) [8].

A sacral dimple (also termed pilonidal dimple or spinal dimple) is a small depression in the skin, located just above the buttocks. The name comes from the sacrum, the bone at the end of the spine, over which the dimples are found. On sacral dimple wroted also [11] and [12].

Sacral dimples are rare, occurring in up to 4% of the population. The majority of these dimples are minor and do not represent any underlying disease; however, the minority may be a sign of disease, notably spina bifida. Even so, this is usually the spina bifida occulta form, which is the least serious kind. [13]

The coccyx consists of an apex, base, anterior surface, posterior surface and two lateral surfaces. The base is located most superiorly, and contains a facet for articulation with the sacrum. The is apex situated inferiorly, at the terminus of the vertebral column.

Pellis laxa (Olecranon skin) is phenomenon of loose skin of elbow, that is relativly non-sensitive to touch. This pelma (fragosus) is also called called solea (as sole skin of external hand, situated around the joints, scrotal skin, perineal skin and skin of elbow). Male pubic sole skin is, however, the gender distingushing phenomenon. Sole skin is consequenes of stretched flexion of most frequent movements, not to shrinking and on inner parts of limbs.

Solea dimples (or solea), four consecutive dimples in the root of fingers, formed between metacarpal bone and proximal phalangs as consequences of stretched flexion in folding of metacarpophalangeal joint. [8]

Table 2. *Skin creases and folds of the head and neck area*

Head and neck area		
Name of the crease	Name of the fold	Other terms used in literature for the crease
Upper eyelid crease Lower lid crease Alar–facial crease Labiomandibular crease Nasolabial crease Postauricular crease	Upper eyelid fold Labiomandibular crease Nasolabial fold	Upper eyelid fold Postauricular groove

Table 3. *Skin creases and folds of the lower limb area*

Subunit	Name of the crease	Name of the fold	Other terms used in literature for the crease
Popliteal fossa	Transverse skin creases of the popliteal fossa		
Foot The plantar surface area	Proximal crease Distal crease Tibial longitutinal crease Medial longitutinal crease Fibular longitudinal crease		Transverse lines Longitudinal line

The 1st toe	Proximal crease Interphalangeal crease		
The 2nd - 4th toe area	Proximal toe crease Medial toe crease Distal toe crease		
The 5th toe area	Proximal toe crease		

Table 4. *Skin creases and folds of the upper limb area*

Subunit	Name of the crease	Name of the fold	Other terms used in literature for the crease
Axillary area	Upper axillary crease Lower axillary crease Axillary creases Lower axillary crease	Anterior axillary fold Posterior axillary fold	
Elbow area	Flexion creases of the elbow		Transverse crease of the elbow
Wrist area	Transverse skin creases of the wrist Distal wrist crease Middle wrist crease Proximal wrist crease	Anterior transverse lines Distal bracelet crease Intermediate crease of the wrist Proximal wrist crease	
The digits The thumb area	Proximal phallangeal crease Distally based proximal phalangeal crease Interphalangeal crease	Proximal set of 2 transverse lines	
The 2nd–5th digit area	Proximal digital creases Medial digital creases Distal digital creases	Metacarpophalangeal crease or proximal set of transverse lines Middle set of transverse lines Distal set of transverse lines	
Dorsal surface of the hand	Transverse creases over the radiocarpal and carpal joints Transverse creases over the metacarpophalangeal joints Transverse creases over the interphalangeal joints		

The skin creases of the human body are fixed and permanent anatomic landmarks characterized by various relationships with the underlying tissues.

In the literature, the terms **"**creases**"** and **"**folds**"** are found to be referring to the same anatomic structure. The skin crease as a fixed and permanent line, as it is obvious from the underlying structures or extensions of the underlying muscle fibers in the dermis of the crease site. The skin fold is characterized by skin redundancy that

is responsible partly, often in combination with connective tissue attachments, for the skin crease. [14]

To [15] a crease is an anatomic structure that is a visible line in the skin, fixed and permanent, and characterized by skin rest, attached to the underlying structures. The term sulcus refers to the groove, trench, or histology studies, is related to connective tissue attachments with the furrow, a general term for a depression.

Skin creases of the human body as in Tables 2, 3. and 4. a Facial creases: upper eyelid crease, nasolabial crease, alar – facial crease, labiomandibular crease. b Palmar creases: Transverse wrist creases of the wrist, longitudinal palmar creases, transverse palmar creases, proximal phalangeal creases, interphalangeal creases, proximal digital creases, medial digital creases, distal digital creases. c Inframammary crease, flexion creases of the elbow, suprapubic crease, crease of the groin, infragluteal crease, transverse creases of the popliteal fossa [15] [6].

Table 5. *Missing partial topologies (exemplefying neck, hand, elbow, neck, rectum and heel)*

Skin creases	Dorsal hand Fork lines Distal and proximal (creases with solae)	Wrist creases Armilla (Prima Secunda Tertia Quatro)	Frontal neck lines Retro neck lines	Achilles lines (heel lines)
Loose skin	Elbow Pellis laxa (Olecranon skin)	Scrotal skin	Perineal skin	Pubic sole skin
Fossae	Rectus Rectusal fosae (Primo Secundo Tertium)	Rectusal hallows Substernal fossa	Coccygeal fossa	

The creases are produced by adhesion of the skin to the deep fascia and are sites of folding of the skin during movement. The digital creases do not lie directly over the associated joints. At the volar area of the wrist, the transverse skin creasesof the wrist or the anterior transverse line are two to threein number. They are the distal wrist crease or thedistal bracelet crease, the middle wrist crease or theintermediate crease of the wrist, and the proximal wrist crease or the proximal crease of the wrist or the proximal bracelet crease.

For instance Bugbee and Botte [16] see corelations between creases and osseus anatomy: Markers placed along palmar skin creases of 53 hands radiographically demonstrated creases superimposed on osseous anatomy. The distal and middle digital creases were found to be consistently proximal to associated interphalangeal joints by 7 to 8 mm and 2 to 3 mm, respectively. Proximal digital creases were consistently distal to associated metacarpophalangeal (MCP) joints by 14 to 20 mm. Distances between the distal transverse palmar crease and associated MCP joints were 6.8 to 10.3 mm.

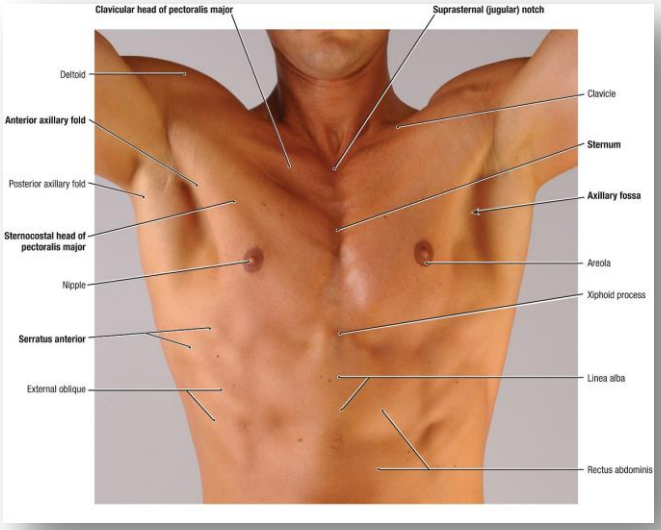

Figure 1. *Effect of xhipoid process, substernum and rectus (rectal primo, secundum)*

The upper eyelid crease is located 8 to 12 mm above the lashesof the upper eyelids and is formed by the subcutaneousinsertions of the terminal fibers of the levator aponeurosis. Thefoldiscreatedbytheexcessskinandmusclethat overhangs the crease. The absence of the upper eyelidcrease is estimated in about 70 % of East Asians due to the lack of the attachments of the aponeurosis. If it is present, it is approximately 46 mm above the lashes' margin. Thelower lid crease is less well defined as there are no subcuta-neous insertions corresponding to those of the upper lid. The alar facial crease is an important crease that frames the nose at the junction of the nasalalar and the cheek. Thesamestructure can be found in literature as the nasolabial groove that is continuous above the nasal ala with the circular groove (sulcus). The alar sulcus is a groove in the skin boundingthenasal alae above and joining the nasolabial sulcus lower limb area. In the popliteal fossa, there is the transverse skin crease of the popliteal fossa. The creases at the foot area, especially of the plantar surface, have also been studiedconcerning their embryological development as described above for the palmar and digital crease, and the majority of them is also developed by the 15th week of gestation. The creases on the plantar surface of the foot are not as complex or constant or so well marked as on the palmar surface of the hand. On the plantar surface of the foot, we find the transverse lines and the longitudinal lines. There are two transverse lines, the distal crease that extends from the fibular borderofthe foottothe first interdigital space and the proximal crease which is less constant even in a child. The longitudinal lines are the tibia longitude increase as the adduction crease of the big toe, the medial longitudinal crease that extends between the second and third toe and ends up running into the tibia crease, and the fibular longitudinal crease, a shallow furrow when it exists at the tibia side of fifth toe.

Author would like to add to this topographies neck and axillary creases or axillary lines. Some of the creases are not always present, like those of armillas (wrist crease), from absent of lines to number of four, or forehead, frontal and retro neck lines, axillary lines. Achilles lines, Calcaneal lines (heel lines), as the result of Achilles tendon to Calcaneus, and walking dynamics of heel flexion. See Table 4.

Palmar creases. In the palm there are three longitudinal and two transverse creases. The longitudinal creases are the thenar, the central and the hypothenar. The most constant and easily differentiated is the thenar crease, due to the wide mobility of the carpo-metacarpal joint of the thumb. The central and hypothenar creases are the reflection of the mobility at the carpometacarpal joints of the ring and small fingers. The two transverse creases are the proximal and the distal. The distal crease starts at the u1nar side of the hand and finishes in between the middle and index fingers, as most of the hand functions are done with the ulnar fingers in flexion for power grasp, while the index and the thumb remain in extension for precision manipulation. The middle finger can either help the thumb and index for manipulation, or the ring and small fingers if more power grasp is needed. The proximal creases tarts at the radial side of the hand along with the longitudinal thenar crease. Flexion of themetacarpo-phalangeal joints takes place in a transverse line between the origin of the distal pal war crease on the ulnar side and the proximal palmar crease on the radial side. [15] [16]

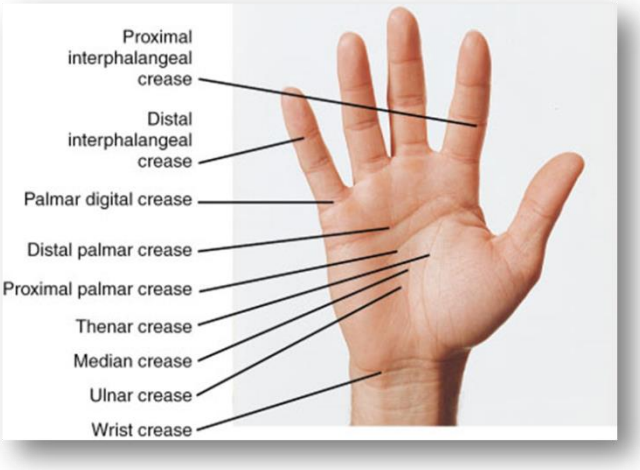

Figure 2. *Flexion creases of the palmar surface of the hand and wrist*

Digital creases. Usually there are two creases at the level of each joint, being most prory, inent the proximal one. The palmar digital crease of the triphalangeal fingers is usually located at the proximal third of the proximal phalanx. The palmar digital crease of the thumb is longitudinally oriented and slightly proximal to the metacarpo-phalangeal joint. The major research and contibution to this topic made International Federation of Societies for Surgery of Hand [5], and G. Kumar [4].

The survey found the existence of nervature and skin nervature specific dermal geometry (dermogeometry), similar to those of biogeometry, caulogeometry with logic dinamic lines as effect of movement, on the examples of ranged fork lines of fingers (phalangeal furca).

In fact, there are no skin lines in stricto senso but only ranks, interupted forks, which act as dynamic or conglomerate lines. Also, specific network nervature of proximal dimples and circular organization of the upper phalagic lines on the outside where the circular involucrum turns into parallel lines, in the case of dynamic anatomy of the hand. Creases are ranked, forming first forks and in further development, dynamic pseudo lines. Dynamic geometry is logical in the

transformation of piled lines into functional folding lines, the specific spherical internal status forms rete, the surficial nervature of phalangeal solae (proximal solae).

By Bugbee and Botte the distal and middle digital creases were found to be consistently proximal to associated interphalangeal joints, quantification of these relationships should assist in hand examination and placement of surgical incisions and provide further insight into anatomic and functional relationships of the hand.[15]

Functional association of the Palmar creases overlying the various osseous structure of the hand have proved as an important anatomical landmark. [17][18]

The knowledge of these creases in relation to the osseous anatomy and the joints of the hand can be of great use to the operating surgeon in various procedures on hand such as for tendon repairs, corrective procedures for webbed fingers, carpal tunnel hand surgery, trigger finger surgery, ganglion cyst removal etc. In Dupuytren's contracture accepted indications for surgical intervention include metacarpophalangeal joint contracture of 30 ° and any degree of proximal interphalangeal joint contracture. [17]

It is noted that there are dynamisms that need to be examined in accordance with dynamic movements, and that surface anatomy is in all a dynamic form that is explained by the dynamism of the internal status, but also with the dynamic benefits of the original topology, as in the case of wrinkles or various muscular constitutions.

Without these dynamic forms, the dynamic effect cannot be thoroughly understood because the external anatomy is not only a consequence of the composition, the classic anatomy, but also the dynamism of the surface and other manifold factors. [6][19]

4. Conclusions

The paper found the necessity of establishing a unique comprehensive system of surface anatomy given the fact that partial anatomies have already been nomenclated by expert researchers (in the case of folds) or professional associations (IFSSH). Surface anatomy contains, however, a whole series of still undefined and non-nomenclated phenomena that can be interpreted only by systematic research. This paper has supplemented some parts of the partial topographies in order to have a more complete proposal for the system of surficial dynamics maps.

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

References

[1] P. F. Harris, C. Ranson. Atlas of living and surface anatomy for sports medicine. Elsevier Health Sciences, 2008.

[2] D. Field, J. S. O. Hutchinson. Field's anatomy, palpation, and surface markings. Elsevier Health Sciences, 2006.

[3] U. Zarins. Anatomy of Facial Expression. Exonicus Incorporate, 2017.

[4] G. Kumar, V. Kamath & S. R. Murali. Nomenclature in the journal of hand surgery. The Journal of Hand Surgery: British & European Volume, 29(1), 85-86, 2004

[5] Terminology for hand surgery. International Federation of Societies for Surgery of Hand, Harcourt Health Sciences, 2001.

[6] G. Lemperle, R. E Holmes, S. R. Cohen & S. M. Lemperle. A classification of facial wrinkles. Plastic and reconstructive surgery, 108(6), 1735-1750, 2001.

[7] B. Reichert, W. Stelzenmueller. Palpation Techniques: Surface Anatomy for Physical Therapists. Thieme, 2011.

[8] L. Cosmo. Micro Topology With Some Insightful Remarks On Topophenomena. First Edition, Lulu Inc, 2017.

[9] S. Meenakshi, K. Y. Manjunath. The tendinous intersections of rectus abdominis muscle. Journal of Mahatma Gandhi Institute of Medical Sciences, 13(1), 34-39., 2008.

[10] H. Gray, W. H. Lewis. Anatomy of the human body. Philadelphia: Lea & Febiger, Vol. 1970, pp. 993-1007, 1942.

[11] J. C. Higgins, F. R. A. N. K. Axelsen. Simple dimple rule for sacral dimples. American family physician, 65(12), 2435-2435, 2002.

[12] B. Drole & M. Garzon. SACRAL syndrome. Dermatology, 215(4), 360-360. (2007).

[13] C. Flannigan (Ed.). A practical Guide to Managing Paediatric Problems on the postnatal wards. Radcliffe Publishing, 2011.

[14] BS Kotlus, RM Dryden. Folds and creases. Plast Reconstr Surg 119(3):1147, 2007.

[15] A. Mallouris, A. Yiacoumettis, V. Thomaidis, A. Karayiannakis, C. Simopoulos, D. Kakagia & A. K. Tsarouch. A record of skin creases and folds. European Journal of Plastic Surgery, 35(12), 847-854, 2012.

[16] W. D Bugbee, M. J. Botte. Surface Anatomy of the Hand: The Relationships Between Palmar Skin Creases and Osseous Anatomy. Clinical orthopaedics and related research, 296, 122-126, 1993.

[17] P. Chauhan, S. Kalra, SK Jain, S. Munjal, and A. Anurag. Relationship between palmar skin creases and osseous anatomy-a radiological study identification. J. Morphol, 28(3), 184-188, 2011.

[18] Y Komatz, K Daijo, O Yoshida. Extra interphalangeal transverse creases of the little finger. Journal of Human Genetics. 1978 Mar 1;23(1):31-7.

[19] SA. Tixa. tlas of surface palpation: anatomy of the neck, trunk, upper and lower limbs. Elsevier Health Sciences, 2015.