Profiles Cephalometric Handbook

Helping you make the most of your analysis

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Dear Doctor,

Profiles Orthodontic Diagnostic Services is a company devoted to assisting you, from the very onset of orthodontic treatment though to post-treatment assessments of your success.

It is the mission of Profiles to ensure that you get exactly what you need in an analysis from lateral to frontal as well as arch analysis, but more importantly that you completely understand and can utilize all the information you receive.

Cephalometrics is often viewed as the dry and tedious, but unavoidable process of orthodontic treatment planning. With Profiles help, you will complete this process with ease, efficiency and excellence. Not only will you have all the factors you need but this handbook has been created to explain what every factor measures and what aspect the measurement describes.

The manual is based on the standard package which includes, Steiner and Sassouni plus analysis. Other analysis information is available upon request.

Regards,

Karen Hogan
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Cephalometrics is the language in which the poetry of orthodontic diagnosis and treatment planning is written. It is not an end unto itself but rather a means by which the clinician may not only solidify and ensure the accuracy of his diagnosis, but also clearly and precisely communicate his orthodontic ideas and problems to the complete understanding of his fellow colleagues.

Dr. Terrance Spahl DDS.

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The Sassouni Plus Analysis

The Sassouni is an excellent system for evaluation purposes, but it does offer some difficulties due to the level of complexity associated with it. It clearly shows a movement in diagnostic thought away from a concern for numerical values and toward an overall evaluation of maxio-facial relationships. It allows for the fact that not only the teeth, but their supporting bony structures as well, may be repositioned with the proper applied techniques.

Dr. Sassouni was one of the first to be concerned for the balance of the total face, analysing harmony not only of the teeth, but their skeletal bases and surrounding facial structures as well.

Taken from The Clinical Management of Basic Maxillofacial Orthopaedic Appliances, Volume II Diagnostics by Witzig/Spahl

Sassouni Planes

**Supraorbital Plane** runs through the most superior point on the roof of the orbit and the point tangent to the most superior portion of the anterior clinoid process. This line acts only as a reference to find the parallel plane.

**Parallel Plane** runs parallel to supraorbital plane through the lowest point of the inferior surface of the sella turcica.

**Palatal Plane** is the line connecting ANS and PNS.

**Occlusal Plane** joining the midpoint of the overlap of the mesiobuccal cusps of the upper and lower first molars with the point bisecting the overbite of the incisors.

**Mandibular Plane** extends from menton to the lowest point of the ramus just posterior to the Antegonial Notch.

**Point “O”**

Point ‘O’ is defined as the area of most common intersection of all four major planes; Parallel Plane, Palatal Plane, Occlusal Plane, and Mandibular Plane. In an ideally balanced face these four planes should intersect at common locus ‘O’. They seldom ever do!

If only three planes converge at the same point it is considered ‘O’ and the remaining is considered a deviant from the general facial pattern. If only two of the four planes interest, ‘O’ is considered at the point where the parallel plane and the mandibular plane meet. If none of the planes intersect at a common point but do converge at a generalised area, they will form a geometric isthmus. A vertical line is drawn at the narrowest point of the isthmus, then ‘O’ is placed at the midpoint of the vertical line.
Sassouni Arcs

**Anterior Arc** - With compass point on ‘O’ an arc is drawn from nasion through all four planes. A well balanced facial profile, this arc should pass through ANS, tip of maxillary incisor, and pogonion.

**Basal Arc** - With compass point on ‘O’ an arc is drawn from ‘A’ point to the level of ‘B’ point. Used to evaluate the apical bases or basal arches of the maxilla and mandible.

**Midfacial Arc** - Again from centre ‘O’ construct an arc from Te to the occlusal plane. In normal dentition the mesial surface of the maxillary first permanent molar should be tangent to this arc. Used to identify the status of the maxillary dentition which in turn gives the status of the mandibular dentition.

**Posterior Arc** - From ‘O’ an arc is drawn through Sp down to the mandibular plane. It should normally pass through gonion. Used to evaluate the relative position of the mandible.

**Inferior Arcs** - The tip of the compass is placed on ANS and extended to SOr. This distance is transferred to the mandibular symphysis area where a small arc is scribed. The compass is then opened 10mm, and a second small arc is scribed. The area between these two small inferior arcs represent the range of normality for vertical position of menton for this individual.

Sassouni Factor Definitions

**Palatal Plane Length (mm)** - The distance between a line drawn perpendicular to cribform, and the anterior arc, measured along the palatal plane.

**Pogonion to ANS arc (mm)** - The distance between pogonion and ANS arc. Describes skeletal AP relations.

**B pt(hard tissue) to A arc (mm)** - The distance between point ‘B’ and the ‘A’ arc.

**A1 to ANS ARC (mm)** - The distance between the tip of the upper incisor to ANS arc.

**ULA Upper Lip Angle (dg)** - The angle formed by the optic plane and a line from the most anterior point on the upper lip through subnasal. Used for soft tissue appraisal.

**Lower Incisor to Mandibular Plane (dg)** - Angle formed by the long axis of the lower incisor and the mandibular plane. Used to describe the protrusion of the denture.

**Upper Part of Gonial Angle (dg)** - Angle formed by lines gonion-nasion and gonion- articular. Used to determine direction of mandibular growth.

**Lower Part of Gonial Angle (dg)** - Angle formed by lines gonion-nasion and gonion- menton. Used to determine direction of mandibular growth.

**Palatal Plane to Upper Incisor (dg)** - Angle formed by the long axis of the upper incisor and the palatal plane. Describes the protrusion of the denture.
The Steiner is very concerned with the profile, and concentrates on the positioning and relationship of the anterior teeth. But to the practitioner in possession of FJO (functional jaw orthopaedic) techniques, the Steiner has its drawbacks. It accepts the skeletal relationships as they are, and is interested in what must be done to the individual teeth to improve the situation by purely orthodontic means. Less emphasis is placed on orthopaedic information, such as lower face height, relative lengths of the maxilla and mandible, degree of facial convexity, or posterior cranial base measurements. It would remain for men to come later to recognise the importance of these concepts and to devise cephalometric analysis systems designed to express them specifically.

Taken from *The Clinical Management of Basic Maxillofacial Orthopaedic Appliances, Volume II Diagnostics* by Witzig/Spahl

### Steiner Factor Definitions

**Interincisal Angle (dg)** - The angle formed by the long axes of the upper and lower incisors. Describes both the vertical and horizontal dimensions of the occlusion of the incisors.

**SNA SellaNasionA (dg)** - The angle formed by points S, N, and A. Describes relation of the cranium to the maxilla.

**SNB SellaNasionB (dg)** - The angle formed by S, N, and B. Describes relation of the cranium to the mandible.

**ANB ANasionB (dg)** - The angle formed by A, N, and B. Describes relation of the maxilla to the mandible.

**SND SellaNasionD (dg)** - The angle formed by lines Sella-Nasion and Nasion- point D (centre of the symphasis) Describes relation of the mandible to the cranium.

**Upper 1 to NasionA (mm)** - Measures the distance between tip of the upper incisor and a line from nasion to point A. Describes protrusion of the denture.

**Upper 1 to NasionA (dg)** - Measures angle formed by long axis of the upper incisor and a line from nasion to point A. Describes protrusion of the denture.

**Lower 1 to NasionB (mm)** - Measures the distance between tip of the lower incisor and a line from nasion to point B. Describes protrusion of the denture.

**Lower 1 to NasionB (dg)** - Measures the angle formed by long axis of the lower incisor and a line from nasion to point B. Describes protrusion of the denture.

**Occlusal Plane to SellaNasion (dg)** - Angle formed by lines occlusal plane and Sella-Nasion.

**SellaNasion to GonionGnathion (dg)** - Angle formed by lines Sella-Nasion and Gonion-Gnathion. Describes vertical dimension of the face.

**Pogonion to NasionB (mm)** - Measures distance between pogonion and a line from nasion to point B. Describes the shape of the symphasis.
Comprehensive Cephalometric Factor Definitions

Dental Relations

Molar Relation (mm) - Measures distal surface of lower molar to distal surface of upper molar, along occlusal plane. Describes angle classification of occlusion.

Canine Relation (mm) - Measures from the tips of upper and lower cuspids along occlusal plane. Describes occlusion of the cuspids.

Incisor Overjet (mm) - Measures from tip of lower incisor to tip of upper incisor along occlusal plane. Describes horizontal occlusion of the anterior teeth.

Incisor Overbite (mm) - Measures tips of upper and lower incisors perpendicular to occlusal plane. Describes the vertical dimension of dental occlusion.

Mandibular Incisor Extrusion - Measures from tip of lower incisor to occlusal plane. Used to describe the cause of dental open or deep bite.

Interincisal Angle (dg) - Measures angle formed by the long axes of upper and lower incisors. Describes both the vertical and horizontal dimensions of the occlusions of the incisors.

Dental To Skeleton

A6 Molar Position to PTV - Measures from distal of 1st upper molar to PTV along occlusal plane. Used to determine the cause of a posterior malocclusion.

B1 to APo Plane (mm) - Tip of lower incisor to plane from point ‘A’ to pogonion. Determines the protrusion of the lower denture.

A1 to APo Plane (mm) - Tip of upper incisor to plane from point ‘A’ to pogonion. Describes the protrusion of the upper denture.

B1 Inclination to APo (dg) - Angle formed by long axis of lower incisor and point ‘A’ to pogonion plane. Describes the position of the lower incisor relative to the mandible and the maxilla.

A1 Inclination to APo (dg) - Angle formed by long axis of upper incisor and point ‘A’ to pogonion plane. Describes the position of the upper incisor relative to the mandible and the maxilla.

Occlusal Plane to Xi (mm) - Distance from occlusal plane to the geographic centre of the ramus. Describes the inclination of the occlusal plane in relation to the mandible.

Inclination of Occlusal Plane - Angle formed by occlusal plane and corpus axis. Describes the inclination of the occlusal plane in relation to the mandible.

B1 Inclination to Frankfurt - Angle formed by long axis of lower incisor to Frankfurt plane. Describes the inclination of the lower incisor relative to a horizontal reference line.
Esthetics

Lower Lip to Esthetic Plane - Distance from lower lip to plane formed by tip of nose to tip of chin. Describes lip protrusion.

Upper Lip Length (mm) - Distance from anterior nasal spine to vermillion border of upper lip. (only accurate when lips are closed.) Can be used to determine the cause of lip strain.

Lip Embrasure to Occlusal - Distance from point where lips meet to occlusal plane. Used to appraise soft tissue. High values may indicate a gummy smile.

NasoLabial Angle (dg) - Angle formed by nose and upper lip. Used to appraise soft tissue.

Nasopharyngeal Airway

NSBa (dg) - Angle formed by nasion - sella plane and sella - basion plane. Used to describe the cranial base.

BaSPNS (dg) - Angle formed by basion - sella plane and sella - PNS (posterior nasal spine). Can be used to determine the horizontal position of the hard and soft palate which is useful for determining the cause of an airway obstruction.

Airway Percent (%) - Determines % of nasopharynx occupied by adenoid tissue. Determines the percentage of nasopharynx occupied by adenoid tissue.

LinderAronson AD1 (mm) - Measured by the distance from PNS to the nearest adenoid tissue in a line from PNS to Basion. Determines cause of airway obstruction.

LinderAronson AD2 (mm) - Measured by the distance from PNS to the nearest adenoid tissue in a line from PNS perpendicular to Sella Basion. Used to determine the cause of an airway obstruction.

Distance PTV to Adenoid - Distance from PTV to nearest adenoid tissue, measured 5mm distal to PNS. Used to determine the cause of an airway obstruction.

Skeletal Relations

Convexity (mm) - Distance from point ‘A’ to nasion - pogonion plane. Describes the horizontal relation of the maxilla to the mandible.

Lower Facial Height (dg) - Angle formed by ANS - Xi (centre of ramus)-pogonion. Describes the vertical relation if the mandible and the maxilla. Low values indicate a skeletal deep bite, high values indicate a skeletal open bite.

Present Patient Height - Patients height in inches if given by dentist.

Posterior face height (mm) - Distance from sella to gonion. Describes the vertical dimension of the ramus with relation to the cranium.

Anterior face height (mm) - Distance from nasion to menton. Describes the vertical dimension of the symphysis with relation to the cranium.

Posterior/Anterior ratio (%) - Posterior face height divided by anterior face height. The ratio of the anterior face height to posterior face height. It is suggested that a norm is about 60 to 62. The higher the ratio the more brachycephalic the face, whereas a lower ratio would indicate a more dolichocephalic facial pattern.

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Skeletal Relations Con’t

Saddle Angle (dg) - Angle formed by nasion - sella - articular. Determines the horizontal position of the glenoid fossae. Low values could indicate more than average forward growth of the mandible.

Condylion A point (mm) - Measures tip of condylion to point ‘A’. Determines the effective midfacial length.

Condylion Gnathion (mm) - Measures tip of condylion to gnathion. Determines the effective mandibular length.

MaxMand Differential (mm) - Condylion - Gnathion minus Condylion - Point ‘A’. Can be used to evaluate a horizontal skeletal imbalance.

Menton ANS (mm) - Distance from menton to anterior nasal spine. Determines the lower anterior face height.

Jaw To Cranium

Facial Depth (dg) - Angle formed by nasion - pogonion and Frankfurt plane. Determines the horizontal relation of the mandible to the cranium.

Facial Axis (dg) - Angle formed by basion - nasion and PTV - gnathion. Can be used to determine the direction of growth of the chin.

Maxillary Depth (dg) - Angle formed by nasion - point ‘A’ and Frankfurt plane. Describes the horizontal relation of the maxilla to the cranium.

Maxillary Height (dg) - Angle formed by nasion - CF - point ‘A’. Describes the vertical relation of the maxilla to the cranium.

Palatal Plane to Frankfurt - Angle formed by two planes. Describes the inclination of the maxilla with relation to the cranium.

Mandibular Plane - Frankfurt Angle formed by these two planes. Describes the shape of the mandible. This factor is also used in facial typing.

BNA Basion Nasion A (dg) - Angle formed by basion - nasion - point ‘A’. Describes the horizontal position of the maxilla to the cranium.

SNA Sella Nasion A (dg) - Angle formed by sella - nasion - point ‘A’. Describes the horizontal position of the maxilla to the cranium.

SNB Sella Nasion B (dg) - Angle formed by sella - nasion - point ‘B’. Describes the horizontal position of the mandible to the cranium.

ANB ANasion B (dg) - Angle formed by point ‘A’ - nasion - point ‘B’. Can be used to describe a horizontal skeletal imbalance of the maxilla and mandible.

Total Facial Height (dg) - Angle formed by basion- nasion plane and corpus axis. Used to evaluate vertical dimension and future growth. Low values may indicate Brachyfacial tendencies, High values may indicate Dolichofacial tendencies.
Internal Structure

Cranial Deflection (dg)  Angle formed by basion - nasion plane and Frankfurt plane. High values may indicate abnormal mandibular growth.

Cranial Length Anterior  Distance from point on PTV to nasion along basion - nasion plane. Describes the length of the anterior cranial base.

Ramus Height (CFGo)  Distance from point on PTV to gonion. Describes the shape of the mandible. Low values may indicate a more vertical facial pattern and possible future TMJ problems.

Ramus Xi Position (dg)  Angle formed by Xi - PTV - Frankfurt plane. Describes the horizontal position of the ramus. High values may indicate abnormal mandibular growth.

Porion Location -Distance from porion to PTV along Frankfurt plane. Describes the horizontal position of Porion and the Glenoid Fossae. Low values may indicate abnormal mandibular growth.

Mandibular Arc (dg)  -Angle formed by corpus and condyle axes. Describes the shape of the mandible.

Corpus Length (mm)  -Distance from Xi (geographic centre of ramus) to pogonion. Used to determine the length of the mandible.