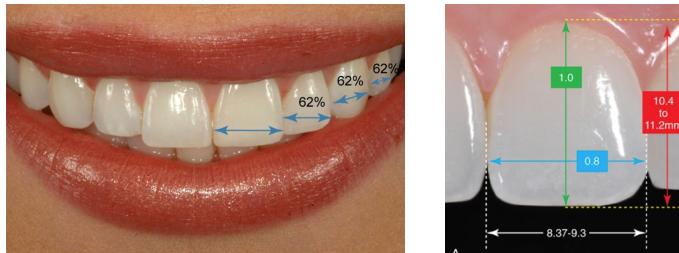


Micro-esthetics: Dental appearance

- Unaffected by the size of view (full face background).
- **Ideal tooth proportions to each other:** = golden proportion of **0.62%**.
From anterior → posterior: **1.0:0.62:0.38:0.24**



- **Height-width proportion** of the individual teeth: Ideal relation incisors to premolars = **0.8**.
(1+1: height 10.4-11.2 mm, width 8.37-9.3 mm)
Check with tables if the width or the length is not correct in case of a disproportion.

Mirabella D.: Ideal relation width - length:

- 1+1: **85%**
- 2+2: **77%**
- 3+3: **80%**

- Gingiva height:

- 1+1 highest level.
- 2+2 1.5 mm lower.
- 3+3 same level as 1+1.

- Gingiva shape:

Refers to the curvature of the gingiva at the margin of the tooth.

- 2+2: Symmetric half oval.
Gingival zenith (most apical point of the tissue) in the longitudinal axis.
- 1+1,3+3: Elliptical and oriented distally to the long axis of the tooth.
Gingival zenith located distal to the longitudinal axis.
- Laypeople and dentist recognize differences of more than 2 mm.

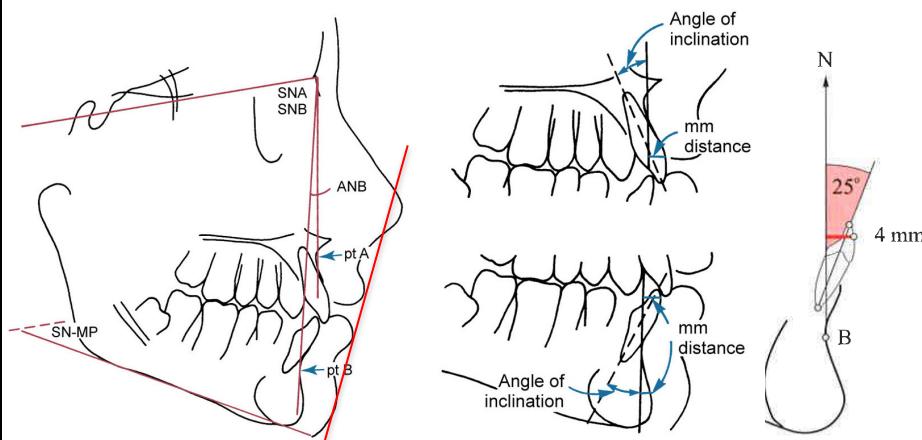


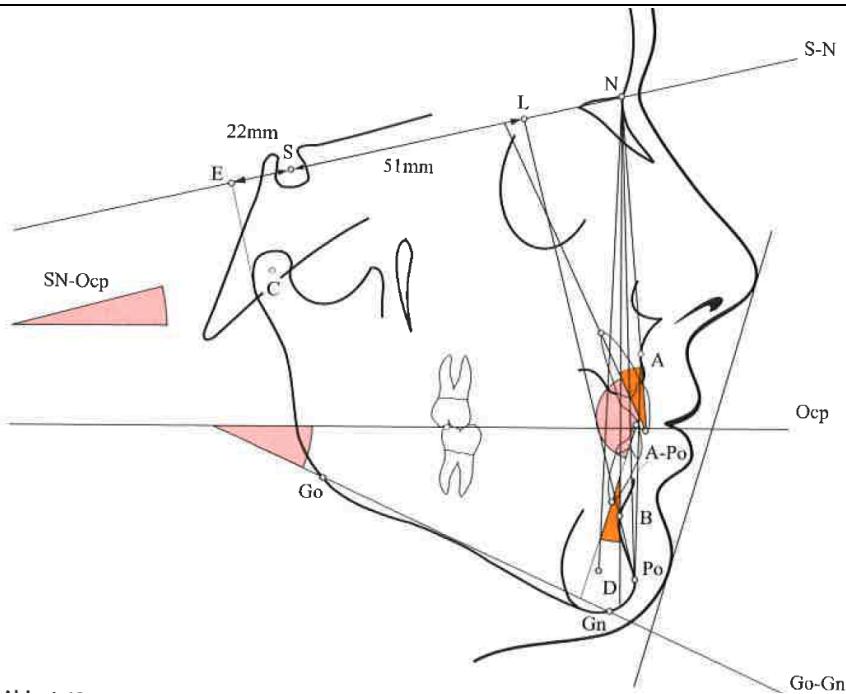
- **Connectors:** = Region where adjacent teeth appear to touch in an unmagnified photograph.
(may extends apical or occlusally from the actual contact point).
 - Greatest height between 1+1.
 - Height diminishes from the anterior to the posterior teeth while moving apically.
- **Embrasures:** = Triangular spaces incisal and gingival to the contact area.
 - Ideally larger in size than the connectors and filled by the interdental papillae.
 - **Black triangles:** = Open gingival embrasure apical to the connectors due to short interdental papillae. Possible causes are periodontal disease or orthodontic corrections of severely crowded and rotated maxillary incisors.
 - *Tarnov 1992:*
Presence of a papilla depends on the distance of the contact point of the alveolar bone.
 - Distance \leq 5mm : Papilla 100% of the patients
 - Distance \geq 7 mm : Papilla 27% of the patients
- **Tooth shade and color:**
 - Lighter and brighter teeth at younger age.
 - Older age: Formation of secondary dentin & thinning of facial enamel.
→ Decrease in translucency and greater contribution of the darker underlying dentin.
 - Normal progression of shade change from the midline to the posterior regions is important for a nice and natural smile.
 - Brightness 1+1 > 2+2 > 3+3. 54+45 more closely matched to 2+2.
 - Bleaching is possible to optimize the tooth shade.

Which diagnostic records are needed?	
Health of teeth and oral structures	<ul style="list-style-type: none"> - IO photographs with maximum retraction of the cheeks and lips. - OPT: <ul style="list-style-type: none"> • Discover pathologic lesions. • Condyles. • Screening image if CBCT or MRI is necessary. - Periapical and BW only if greater detail is required. (suspicion of root resorption, periodontal diseases) → ABO: Individual IO radiographs are required for adults to supplement the panoramic radiograph. Exception: If only a partial fixed appliance is planned. - CBCT for impacted canines.
Dental alignment and occlusion <u>Indications:</u> → for adults only: - Restorations - TMJ diseases - Orthognathic surgery - CR/IK slide	<ul style="list-style-type: none"> - Impressions for dental casts (plaster or digital). - Dental casts should have symmetric bases oriented to the midline of the palate: → Easier to analyze arch form and detect asymmetry within the dental arches. - Neatly trimmed and polished casts are more acceptable for presentation to the patient. - Bite registration in IK. Additionally in CR, if a lateral shift or great anterior shift exists. - <u>Articular mounting:</u> Matter of debate if necessary: <ul style="list-style-type: none"> • Document discrepancy between the occlusal relation at the initial contact of the teeth and the relation at the patient's full or habitual occlusion. • Record the lateral and excursive paths of the mandible. • Important for restorative dentistry: → Restored teeth must accommodate the path of movement. • No point for preadolescent patients: <ul style="list-style-type: none"> ○ Contours of the TMJ are not fully developed: → Condylar guidance is much less prominent than in adults. ○ Shape of the temporal fossa reflects function during growth in adults. Completion of the articular eminence and the medial contours of the joint do not develop until mature canine function is reached and the chewing pattern matures from the one of a child to the one of an adult. ○ Relationship between the dentition and the joint which is recorded in articulator mounting changes rapidly while skeletal growth is continuing and tends to be only of historic interest after orthodontic tx. • Indicated in adults with TMJ problems to document significant discrepancies between habitual and relaxed mandibular position. • Indicated for orthognathic surgery planning. • Virtual articulators are available and are accurate (cave: high costs).
Facial and dental appearance	<ul style="list-style-type: none"> - No growth modification in children without a pre tx ceph. - No ceph is required if minor problems in children or adjunctive procedures in adults are treated without significant changes of jaw relationship or incisor position. - Frontal, profile and oblique eo pictures. - Optional a video sequence showing the patient in function.
Analysis and diagnostic records	
Cast analysis: symmetry space tooth size	<ul style="list-style-type: none"> - <u>Symmetry:</u> <ul style="list-style-type: none"> • Asymmetric arches are also possible in a symmetric face. • Place a transparent ruled grid over the dental arch to make detection of distortions easier. • Asymmetry in arch form. • Asymmetry within the dental arch, but with symmetric arch form due to lateral drifts of teeth. - <u>Alignment (Crowding): Space Analysis.</u> Measure the size of the teeth vs. the space available for them. - <u>Tooth size analysis:</u> <ul style="list-style-type: none"> • 5% of population have some degree of disproportion among the sizes of individual teeth = tooth size discrepancy. • Bolton analysis, 1957: Measure the md width of each permanent tooth. Compare the summed widths from the upper teeth (6 or 12) with the total width of the lower teeth. Proportions: <ul style="list-style-type: none"> - Bolton 6: 77.2%

	<ul style="list-style-type: none"> - Bolton 12: 91.3% Cave: Bolton measured 55 models with ideal OJ, OB and alignment. Bolton analysis neglects arch shape, tip, torque & bucco-lingual width of the teeth which contribute to the alignment. • Indices for discrepancy: <ul style="list-style-type: none"> - 2+2 not wider than 2-2. - 5+5 should have the same width as 5-5. - Discrepancy <1.5 mm is rarely significant for tx. Othmann, 2007: Discrepancy < 2 mm is not clinically significant. - If the discrepancy is larger: → Achieving an ideal occlusion can be difficult.
Cephalometric analysis → s. Block course Geneva for different analysis & pictures	<ul style="list-style-type: none"> - First introduced 1934 by Hofrath in Germany and Broadbeck in the US. - A lateral ceph is necessary to distinguish and clarify the differing dental and skeletal contributions to malocclusions which present identical dental relationships. - Detect pathologic processes and anomalies in the cervical spine. (degenerative processes) - Any malocclusion is created by interaction of: <ol style="list-style-type: none"> 1 Cranium and cranial base 2 Skeletal maxilla and nasomaxillary complex 3 Skeletal mandible 4 Maxilla teeth and alveolar process 5 Mandibular teeth and alveolar process <p>(1-3 exist independent from the teeth, 4 & 5 can be displaced independent from the supporting bone)</p> - Superimposition: <ul style="list-style-type: none"> o Recognize and evaluate changes from tx and growth. o Distinction of the two of them is not possible. - Construct 50-100 landmarks: <ul style="list-style-type: none"> o Compare the lines and angle measurements or express the data graphically to compare it with a graphic reference. o Landmarks can be intersections or extreme points. (e.g. the most anterior point of the chin) Cave: Extreme point's location changes with the head position. - Sources for errors: <ul style="list-style-type: none"> o Head position o Magnification o System error o Distortions o Localization of the landmark - Compare the patient with a reference group: - Down's analysis: <ul style="list-style-type: none"> o First done after WW II (~1948). o Developed at the university of Illinois. o Reference group = 25 untreated adolescent whites with ideal dental occlusion. - Steiner: Measurements originally based on one Hollywood starlet. - Michigan growth study: <ul style="list-style-type: none"> o Developed in Ann Arbor. o Typical group of children including those with mild and moderate malocclusion (better than to take only individual with ideal occlusion). o Reference group mostly used nowadays. - Burlington: <ul style="list-style-type: none"> o Developed in Ontario. - Bolton study: <ul style="list-style-type: none"> o Developed in Cleveland.
Choice of horizontal reference lines	<ul style="list-style-type: none"> - Frankfurt plane: = Horizontal reference line for the orientation. <ul style="list-style-type: none"> o Originally developed for the orientation of dried skulls 1882 at a conference in Frankfurt. o Upper rim of the external auditory meatus (porion) to the inferior border of the orbital rim (orbitale). Machine porion from the earplugs is sometimes used to replace the porion. o Cave: Porion is difficult to localize on the lateral cephalogram.

	<ul style="list-style-type: none"> - SN line: <ul style="list-style-type: none"> o 6-7° upward anteriorly to the Frankfurt plane. o If the difference is sign. > 6°, any measurement based on SN should be corrected by this difference. - Physiological head position: <ul style="list-style-type: none"> o Established physiologically not anatomically. o Individuals should look at a distant object or with the eyes in a mirror and move the head slightly up and down in increasingly smaller movements. o Precisely reproducible within 1-2°. o Up to 10° difference to the anatomically Frankfurt plane. o The established line is perpendicular to the true vertical line. o Preferred reference line in modern cephalometrics.
Downs analysis 1948	<ul style="list-style-type: none"> - First done after WW II. Developed at the university of Illinois. - Reference group = 25 untreated adolescent whites selected due to their ideal dental occlusion. - 4 facial types: <ul style="list-style-type: none"> o Mesognathic with straight profile and normal chin. o Retrognathic with recessive chin. o Prognathic where chin is prominent. o Prognathism when mandibula is large. - Facial angle. - Chin prominence: N-Po / FH. - Mn plane angle: ML / FH. - Y axis: S-Gn / FH. Forward or backward position of chin in relation to the face (60°).
Steiner analysis 1950	<ul style="list-style-type: none"> - Reference values originally based on one Hollywood starlet. - SNA, SNB. - ANB (main interest of Steiner) magnitude of skeletal discrepancy. <ul style="list-style-type: none"> o Influenced by the vertical height of the face (vertical height ↑ → ANB ↑) o Influenced by the anterior / posterior position of N (jaw protrusion ↑ = ANB ↑) o Influenced by the AP difference in jaw position. - Angular inclination (DD tipping vs. bodily movement) and Distance (establish the relative protrusion of the dentition) in mm: <ul style="list-style-type: none"> o Upper incisors to NA o Lower incisor to NB - Chin prominence: Pogonion to NB - Holdaway ratio (Holdaway 1983) : LI-NB / Po-NB <ul style="list-style-type: none"> o Ideal: 1:1. o If > 4:1 → extractions are indicated o → The more prominent the chin, the more prominent the incisors can be. - Inclination of the mn plane to SN = vertical indicator. - S-Line: Po – Pronasion (Pronasion = midpoint line subnasale & tip of the nose)





Cave:

- More posterior position of N or more protrusive jaws → ANB ↑ even if the horizontal relationship is not changed.
- Relies only on tooth movement to correct skeletal malocclusion.
→ This is represented by the **Steiner compromises**: Ideal values for upper and lower incisor inclination adapted to the sagittal malocclusion (ANB)

Tabelle 4-14 Individualisierte Sollwerte der Schneidezahnstellung in Abhängigkeit vom ANB-Winkel nach Steiner															
ANB	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
1-NA [mm]	11	10	9	8	7	6	5	4	3	2	1	0	-1	-2	-3
1-NB [mm]	2,25	2,5	2,75	3	3,25	3,5	3,75	4	4,25	4,5	4,75	5	5,25	5,5	5,75

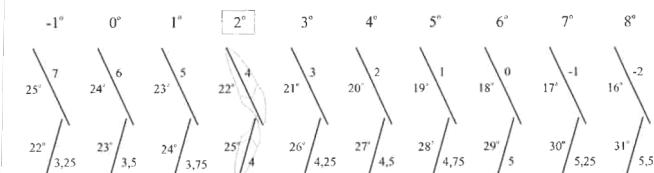
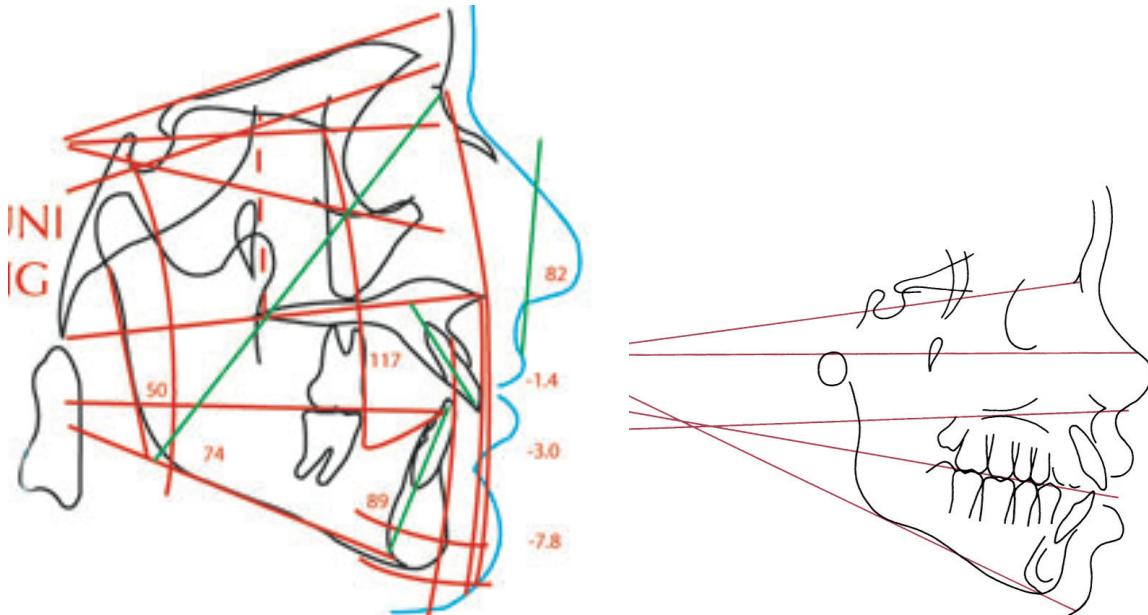


Abb. 4-42
Schematische Darstellung der individuellen Schneidezahnstellung von Inklination und Position

Sassouni analysis 1955

- Mediterranean sample, 100 individuals.
- First analysis to emphasize vertical AND horizontal relationships and the interaction between vertical and horizontal proportions:
 - Point out several horizontal anatomic planes → tend to converge toward a single point (called X here):
 - **Anterior cranial base**
 - **FHP**
 - **Palatal plane**
 - **Occlusal plane**
 - **Mandibular plane**
 - Inclination of the planes to each other reflect the vertical proportionality of the face:
 - Intersection close to the face and quick divergence when passing anteriorly → proportion long anteriorly, short posteriorly.
= **Skeletal open bite**. (term introduced by Sassouni)
 - Lines nearly parallel, converge far behind the face
= **Skeletal deep bite**. (term introduced by Sassouni)

	<ul style="list-style-type: none"> • Unusual inclination of one plane needs further examination. • Sagittal component: <ul style="list-style-type: none"> - Anterior arc with center in X through: Spa - Is -Pg. - Posterior arc with center in X through: Sp (posterior wall of sella turcica) - Go. <p>→ Evaluation of the relationship of various points to this arc. Cave: Difficult if the face becomes more disproportionate.</p>
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Ricketts analysis 1960	<ul style="list-style-type: none"> - Measurements to locate the chin space: <ul style="list-style-type: none"> • Facial axis of angle: Ba-N – Pt-Gn: Describes the direction of growth of the mandible at the chin. Remains stable in a normally growing child or reduces a little. • Facial depth angle FH to N-Pog. • Mandibular plane angle: ML to FH. • Lower face height: ANS-Xi and Xi-Pm • Mandibular arc: DC-Xi to the distal extrapolation of the corpus axis. - Measurements to determine convexity: <ul style="list-style-type: none"> • Convexity of point A: A to facial plane measured perpendicular in mm. - Measurements to locate the denture in the face: <ul style="list-style-type: none"> • Lower incisors protrusion: Iii to A-Pg. (A-Pg defined by Downs) • Lower incisor inclination to A-Pg. • Upper molar position: = Distance between the most distal point of the maxillary first permanent molar and PTV (= Hinterwand fossa pterygoidalis). Norm = patient's age + 3 mm. At least 21 ± 3 mm need in later years for the eruption of the 2nd & 3th molar.
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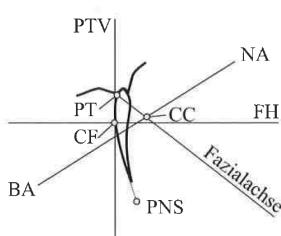


Abb. 4-53
Bestimmung der Punkte PT, CF und CC in der Ricketts-Analyse: Der Punkt CF beschreibt den

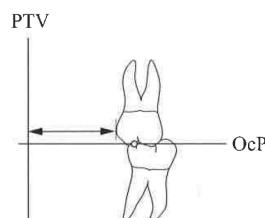
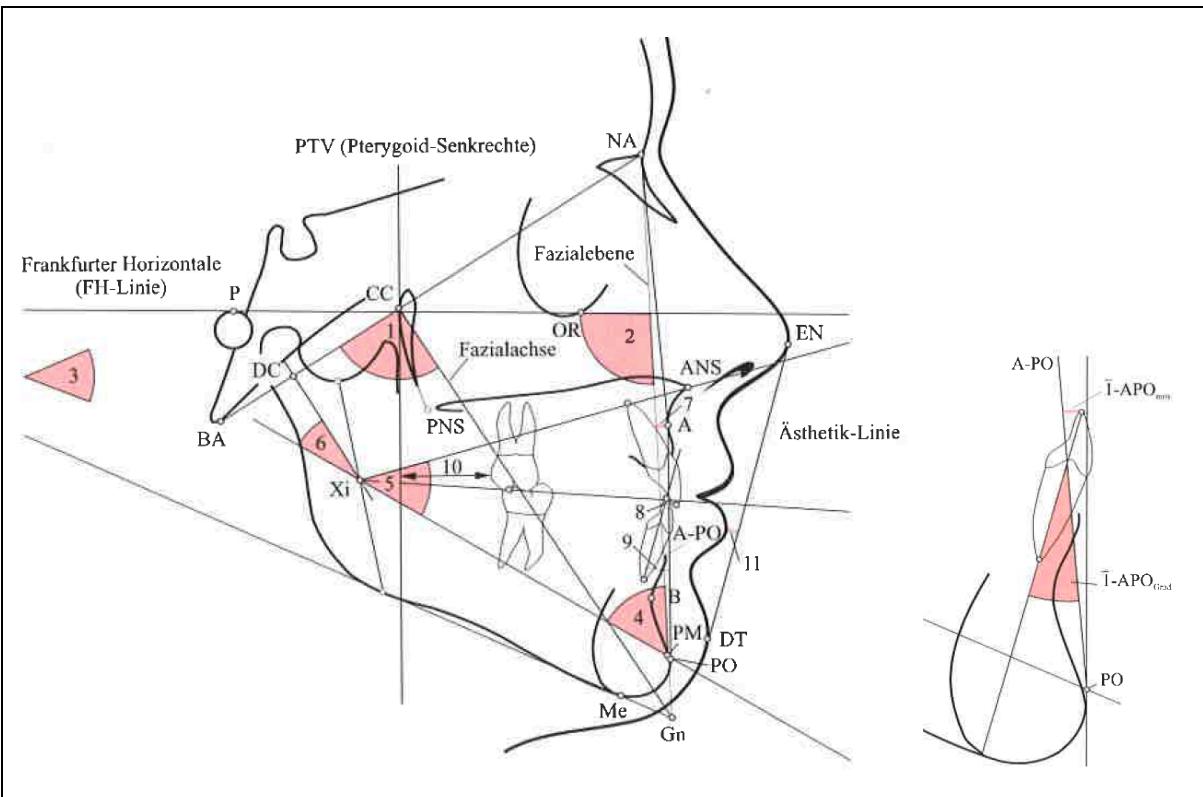


Abb. 4-54
Stand des oberen ersten Molaren zur Pterygoidenskruetten (PTV)

- **Interincisal angle.**
- Measurements to determine the profile:
 - **Lower lip to E-plane** (tip of the nose - tip of the chin).
Lips should be behind this line
 - **Maxillary depth:** N-A to FH



Tweed 1969	<ul style="list-style-type: none"> - Sum of the angles = $\sim 180^\circ$.
Harvold analysis 1974	<ul style="list-style-type: none"> - Aimed to describe the severity or degree of jaw disharmony. - Development of "unit lengths" for mn & mx. - Teeth have no influence on the measurements. - Data from the Burlington growth study (Ontario). - Cave: Vertical distance between mx and mn $\downarrow \rightarrow$ anterior position of the chin \uparrow for any given unit difference. <ul style="list-style-type: none"> - Mx length: TMJ (posterior wall of the glenoid fossa) - to ANS (defined where the spine is 3 mm thick) - Mn length: TMJ - gnathion - Lower face height: Upper ANS (where the spine is 3 mm thick) - menton.

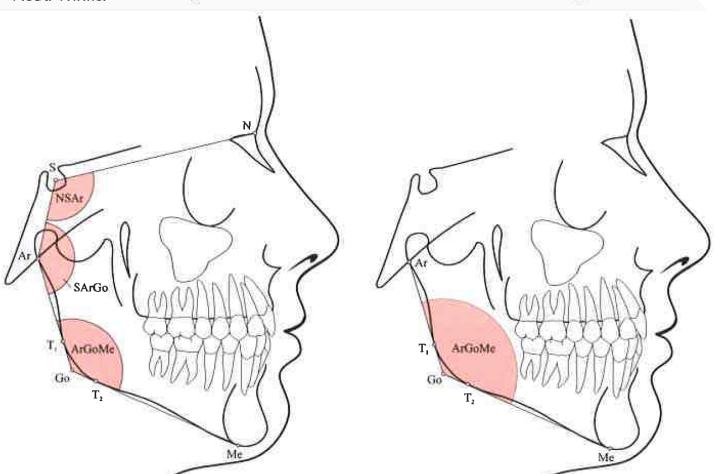
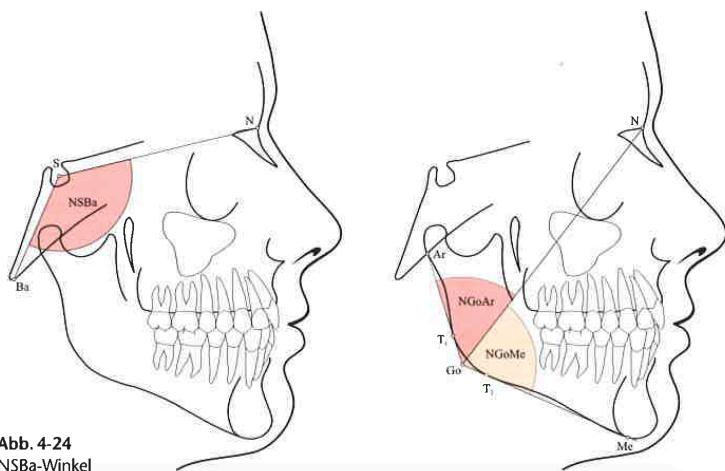
**Björk & Jarabak
1972**

(Jarabak analysis = based on the analysis of Broadbent, Björk, Downs, Steiner, Ricketts, Sassouni und Wylie)

- Useful to predict growth.
- Sample: 300 subjects of 12 y, 300 soldiers 21-23 y.

- 5 angles:

- **Saddle angle:** S - N - Ar.
Dolicho-/ Meso-/ Brachiofacial cannot be modified.
- **Articulare angle:** S - Ar - Go.
Retro-/Prognathism.
- **Gonial angle:** Ar - Go - Me.
Shape of the mandible
- **Upper ½ Gonial angle:** Horizontal indicator.
- **Lower ½ Gonial angle:** Vertical indicator.
- **Summenwinkel** = saddle angle + articulare angle + gonial angle = $396^\circ \pm 4^\circ$



- Direction of growth:

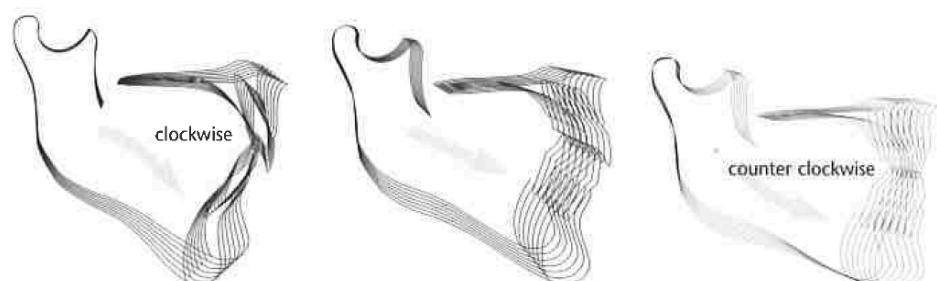


Abb. 4-57
Wachstumstypen nach Jarabak: clockwise, neutrales und counter clockwise Wachstum

<p>Wits analysis (Jacobson, 1975)</p> <p>University of Witwatersrand South Africa</p>	<ul style="list-style-type: none"> - Wits: = Projection of A & B to the occlusal plane. → Measure the linear difference between the points: Nearly 0 in females / -1 in males with a normal anterior-posterior jaw relationship. - Aimed to describe the severity or degree of jaw disharmony. - Influenced by the teeth (horizontally and vertically) and the curvature of the lower occlusion (Spee curve). <ul style="list-style-type: none"> o Posterior rotation of the occlusion = Wits ↓. o Anterior rotation of the occlusion = Wits ↑. - Indication: To be used when the ANB is not reliable. - Fails to distinguish skeletal and dental discrepancies. - Does not specify which jaw is wrong if there is a skeletal problem.
<p>Holdaway analysis 1983</p>	<ul style="list-style-type: none"> - Holdaway ratio : LI-NB / Po-NB. → The more prominent the chin, the more prominent the incisors can be. - H-Line: Pg - upper lip point. - H-angle: Angle H-Line / NB
	<p>Abb. 4-48 Nasolabialwinkel und Weichteilwinkel nach Holdaway</p> <ul style="list-style-type: none"> - Anatomic Frankfort plane & basion-nasion line used as reference lines. - McNamara line = Line through point N, perpendicular to FH = Nasion perpendicular. - Anterior-posterior position of maxilla / mandibula evaluated to their position in relation to the nasion perpendicular. - Comparison of maxillary and mandibular length. (linear relation between both of them = Harvold approach) - I/ related to the maxilla with line through A perpendicular to FH. (similar to Steiner) - I/ related to A-Pg line. (Ricketts) - <u>Analysis of the airways</u>: <ul style="list-style-type: none"> o Upper pharynx diameter: = Shortest distance from posterior pharyngeal wall to the anterior half of the soft palate. Breathing is impairment if the distance is decreased. o Lower pharynx diameter: = Shortest distance from posterior of the tongue to the posterior pharyngeal wall. If >15 mm: Prognathism, enlarged tonsils, mouth breather, dolichofacial pattern. - <u>Vertical values</u>: <ul style="list-style-type: none"> o Lower anterior facial height: ANS to Me o Mandibular plane angle o Facial axis angle (PTM, Ba, N, Gn) → anticlockwise/clockwise - <u>Soft tissue evaluation</u>: <ul style="list-style-type: none"> o Nasolabial angle. o Cant of the upper lip in relation to a vertical line through N. - <u>Pros</u>: <ul style="list-style-type: none"> o Normative data are based on the well-defined Bolton sample. o Anterior-posterior difference of the maxilla and mandibula is projected to an approximation of the true vertical line. → The difference is measured how it is visualized by the patient (nearly true horizontal line).

	<table border="1"> <thead> <tr> <th>Measurements</th><th>Mean</th></tr> </thead> <tbody> <tr> <td>Maxillary protrusion (mm distance from nasion perpendicular-point A)</td><td>2 mm</td></tr> <tr> <td>Maxillary incisor protrusion (mm distance from line parallel to nasion perpendicular to labial surface of incisor)</td><td>4 mm</td></tr> <tr> <td>Maxillary length</td><td></td></tr> <tr> <td>Mandibular length</td><td></td></tr> <tr> <td>Lower face height (LFH)</td><td></td></tr> </tbody> </table> <p>As in Harvold analysis</p>	Measurements	Mean	Maxillary protrusion (mm distance from nasion perpendicular-point A)	2 mm	Maxillary incisor protrusion (mm distance from line parallel to nasion perpendicular to labial surface of incisor)	4 mm	Maxillary length		Mandibular length		Lower face height (LFH)	
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Maxillary length													
Mandibular length													
Lower face height (LFH)													
Counterpart analysis by Enlow 1972	<ul style="list-style-type: none"> - Changes in proportions in one part of the head and face (skeletal or dental) can either add to increase a jaw discrepancy or compensate so that the jaws fit correctly even though there are skeletal discrepancies. - Adaption in clinical practice: <ul style="list-style-type: none"> o The judgment should be based on how the values are related to each other (face type) rather than judge "normality" based on individual values (cephalometric values). o Examination of the patient's proportions. 												
	<p>If anterior face height is long, facial balance and proper proportion are preserved if posterior face height and mandibular ramus height also are relatively large. On the other hand, short posterior face height can lead to a skeletal open bite tendency even if anterior face height is normal because the proportionality is disturbed. The same is true for AP dimensions. If both maxillary and mandibular lengths are normal but the cranial base is long, the maxilla will be carried forward relative to the mandible, and maxillary protrusion will result. By the same token, a short maxilla could compensate perfectly for a long cranial base.</p>												
Template analysis	<ul style="list-style-type: none"> - = Direct comparison of the lateral ceph of a patient with a template. <ul style="list-style-type: none"> → Compensatory skeletal and dental deviations within an individual can be observed directly. → Overall impression how the patient's dentofacial structures are related. - Templates: <ul style="list-style-type: none"> • Schematic templates: (Michigan (Ann Arbor), Burlington (Ontario)) Show the changing position of selected landmarks within age on a single template. • Anatomically complete templates (Broadbent-Bolton (Cleveland, Alabama)): <ul style="list-style-type: none"> o More used. o Different templates for each age. o Convenient for direct visual comparison with the patient's ceph. o Cranial base & maxillary / mandibular superimposition. o Most often, the Bolton templates are used. - Choose a template according to the patient's physical size and the developmental age. Length of the anterior cranial base should be approximately the same for the patient and the template. - <u>Superimpositions:</u> <ul style="list-style-type: none"> • Cranial base (SN-line): Relationship maxilla / mandibula to the cranium. • Maxillary superimposition on the palatal contour of the maxilla: Relationship of the maxillary dentition to the maxilla. 												

	<ul style="list-style-type: none"> Mandibular superimposition on the mandibular symphysis along the lower border / mandibular canal if it's present: Relationship of the mandibular dentition to the mandible.
Cephalometric analysis summary	<ol style="list-style-type: none"> Pathologic issues present? 1:1000 ceph shows severe pathologic processes. Check for head positioning errors in case of an asymmetry. Check landmark points. Look for consistency of similar types (sagittal or vertical) of measurements. Look for facial proportions or lack of it.
Analysis of 3D images from CBCT	<ul style="list-style-type: none"> - Indications to use CBCT: <ul style="list-style-type: none"> Ectopically erupting or impacted teeth (esp. 3+3) requiring surgical exposure: <ul style="list-style-type: none"> Extend of damage to adjacent permanent teeth. Define the path along which the tooth should be moved to bring it efficient into the mouth without further damage. <i>(studies show, that CBCT influences the way of tx planning regarding how to align the retained tooth)</i> If a small field of view FOV is chosen, radiation is equal to ± 2 periapical x-ray. Severe facial asymmetry, especially asymmetries involving roll and yaw: <ul style="list-style-type: none"> Distances between any points can be measured. If a severe asymmetry exists, may chose CT to produce a precisely dimensioned stereolithographic model of the skeleton from the data. Cave: CT = higher radiation doses. Syndromes and sequel of facial trauma. Hard tissue problems in the TMJ. - Contrast resolution: = Ability to distinguish between tissues of different densities. (somewhat limited in CBCT because images have low soft tissues contrast). - Spatial resolution = Ability to distinguish between separate structures that are positioned very close together. Voxel size $\downarrow \rightarrow$ spatial resolution \uparrow. - Noise: = Unevenness of the distribution of the x-ray radiation on the radiographic field. (There are always some voxels which get more or less radiation and they pretend that they are thicker or erosive structures.) Exposure \uparrow = Noise \downarrow (= evenness \uparrow) - Determinants of radiation doses: <ul style="list-style-type: none"> Greater resolution needed \rightarrow Radiation doses \uparrow Voxel size $\downarrow \rightarrow$ Radiation dose \uparrow Field of view Exposure \uparrow = Noise \downarrow - Pathologic changes on CBCT should be detected either by a trained orthodontist or a maxillofacial radiologist. - Synthetic ceps created from the CBCT images are comparable enough to conventional cephalograms for clinical use. - Superimposition is possible on landmarks (some success at defining them at the moment) or more accurate voxel-based at the cranial base. - Changes between two timepoints can be displayed as color maps.
Notes seminar Karl Dulla: OPG	<ul style="list-style-type: none"> Aufhellung im Proc. condylaris = Fossa pterygoidea - Speichelsteine: <ul style="list-style-type: none"> Parotissteine im Stenongang. OPT ~ Mitte R. ascendens. Submandibularissteine im Watsongang. OPT regio 8-8 nach cranial-mesial. Ø Therapie von Speichelsteinen, solange Ø Beschwerden. - Verkalkungen des Lymphgewebes: <ul style="list-style-type: none"> Lymphknoten: Im Angulus mn Bereich. Weiter posterior als Submandibularissteine. Tonsillolythen: In Tonsillenkrypten. Oft bei jungen Patienten. Sichtbar IO. - Verkalkungen der Gefässwänden: <ul style="list-style-type: none"> Artheromatosen: Karotisverkalkungen. Regio C3, C4. \rightarrow Risiko für Hirninfarkt, wenn sie sich lösen.

	<ul style="list-style-type: none"> • Arteriolosklerosen: Verkalkungen in kleinen Gefäßen. • Phlebolith: Verkalkungen von kleinen Thromben z.B. in Venenklappen. <p>- Verkalkung von Ligamenten:</p> <ul style="list-style-type: none"> • Lig. stylomandibulare / Lig. stylohoideum → Eagle Syndrom. <p>- Odontom:</p> <ul style="list-style-type: none"> • Komplex = strukturlos. • Zusammengesetzt = viele kleine Zahngebilde.
Notes	
<ul style="list-style-type: none"> - <u>Peg shaped teeth:</u> <ul style="list-style-type: none"> ○ = m-d width at the contact point < m-d width cervical. ○ Prevalence: <ul style="list-style-type: none"> ▪ Whites: 1.3% ▪ Blacks: 1.5% ▪ Mongolese: 3.1% ○ RR female vs. males = 1.35 	
<ul style="list-style-type: none"> - <u>Squeezed premolars:</u> <ul style="list-style-type: none"> ○ = diameter m-d > diameter b-l. ○ Prevalence ~0.6%. 	
<ul style="list-style-type: none"> - <u>Dens invaginatus:</u> <ul style="list-style-type: none"> ○ = Invagination of the enamel organ into the dental papilla before the mineralization took place. ○ Prevalence: <ul style="list-style-type: none"> ▪ 6.8% ▪ Mostly permanent teeth. ▪ 90% 2+2. ▪ 6.5% posterior teeth. ○ Types: <ul style="list-style-type: none"> ▪ 1. 79%. Within the crown. ▪ 2. 15%. Extension into the pulp within the root channel. ▪ 3a. Extension beyond the root channel. Ø communication with the pulp. PDL contact through lateral pseudo foramina. ▪ 3b. Extension beyond the root channel. Ø communication with the pulp. PDL contact through the foramen apicale. 	
<ul style="list-style-type: none"> - <u>Taurodontism:</u> <ul style="list-style-type: none"> ○ = Failure of the diaphragma of the Hertwig Epithelscheide to invaginate at the correct vertical level. → Ø invagination at the cemento-enamel junction. ○ Prevalence: <ul style="list-style-type: none"> ▪ 2.5-3.2% US ▪ Mostly molars. ▪ Primary and permanent teeth concerned. ▪ Uni- or bilateral. ▪ Frequently in patients with Down's syndrome. ○ <i>Kjar, 2008:</i> Risk for apical root resorptions. 	
<ul style="list-style-type: none"> - <u>Transposition:</u> <ul style="list-style-type: none"> ○ Prevalence: 0.33% ○ M=F. ○ Mx > Mn → Hypothesis: Mx = less dense bone. ○ May associated with delayed exfoliation of primary teeth. 	

Orthodontic classification

- Reduce the database to a patient's problemlist:

- Angle classification

Normal occlusion	Normal (Class I) molar relationship, teeth on line of occlusion
Class I malocclusion	Normal (Class I) molar relationship, teeth crowded, rotated, and so on
Class II malocclusion	Lower molar distal to upper molar, relationship of other teeth to line of occlusion not specified
Class III malocclusion	Lower molar mesial to upper molar, relationship of other teeth to line of occlusion not specified

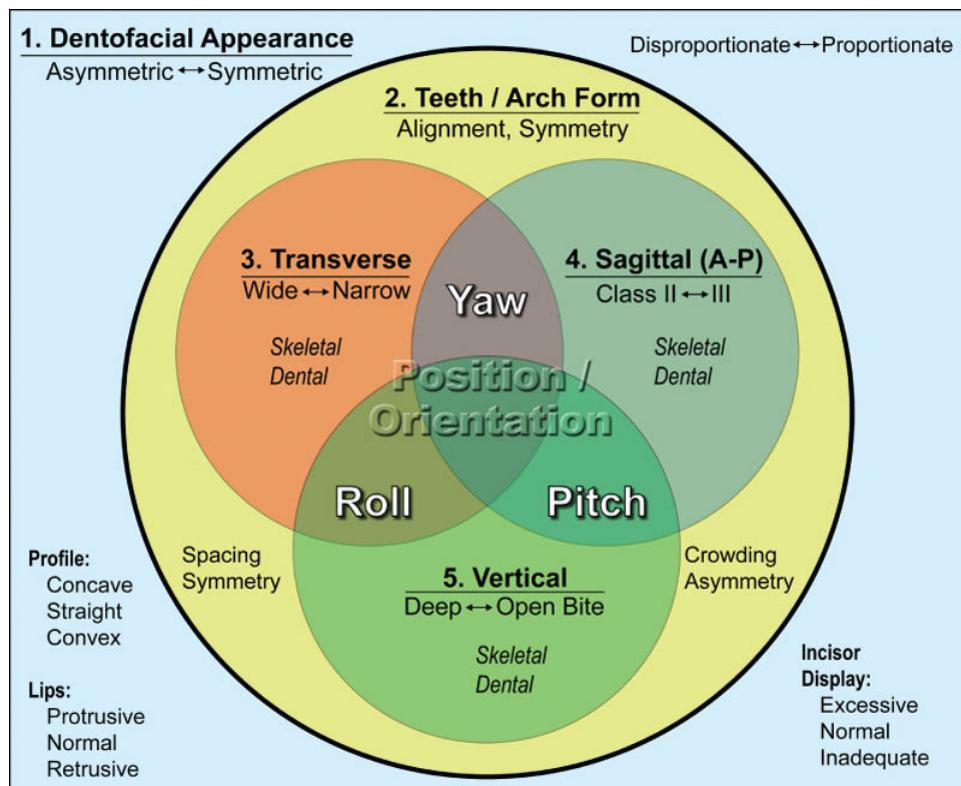
- *Martin Dewey*: Proposed subdivisions for Angle cl.I.
- Cl.II subdivision = Occlusion is cl.II on one side and cl.I at the other.

- Extension of the Angle classification:

- Type of malocclusion
 - Molar relationship
 - Jaw relationship
 - Pattern of growth

→ Although the 4 factors correlate with each other, correlations are far from perfect.

- 1960 Ackermann & Proffit:
5 Characteristics Classification System
Interaction of the tooth and jaw relationship with the facial appearance



- Additions to the 5 characteristics classification system:

- **Esthetic line of dention**:

Follows the facial edges of the maxillary anterior and posterior teeth which are seen when the anterior tooth display is evaluated.