

The Hebrew University of Jerusalem

Syllabus

Imaging methods in Orthodontics - 97999

Last update 16-12-2014

HU Credits: 5

Degree/Cycle: 2nd degree (Master)

Responsible Department: Dentistry

Academic year: 1

Semester: Yearly

Teaching Languages: English

Campus: Ein Karem

Course/Module Coordinator: Dr Abed yossi

Coordinator Email: abedy@cc.huji.ac.il

Coordinator Office Hours: Monday and Tuesday, by appointment

Teaching Staff:

Yossi Abed
Ilana Brin
Yocheved Ben-Bassat
Silvina Friedlander
Micheal Yitschaky
Moshik Tandlich

Course/Module description:

This course provides a broad insight into both the theoretical and the practical aspects of cephalometrics and imaging as essential tools in orthodontic diagnosis and follow-up.

Course/Module aims:

*To present the basics of cephalometrics and other modern imaging techniques.
To discuss and practice a variety of cephalometric analyses.*

Learning outcomes - On successful completion of this module, students should be able to:

Make an orthodontic diagnosis based on cephalometrics and other imaging systems.

Attendance requirements(%):

100%

Teaching arrangement and method of instruction: frontal lectures and seminars and practical sessions. Reading assignments for each seminar session is to provide background information for class discussions related to the scheduled topics.

Course/Module Content:

*Prof Ben Bassat & Brin Introduction & Landmark identification- tracing exercise (1)
20/10/14 Mon 11:15-14:00
2 2 Prof Brin Landmark identification and tracing exercise (1) 23/10/14 Thur
9:15-12:00
3 3 Dr. Abed Steiner analysis 27/10/14 Mon 13:15-16: 00
4 4 Dr. O. Yitschaky Downs analysis 03/11/14 Mon 11:15-14:00
5 5 Dr. Abed Sassouni analysis including Proportional Analysis 10/11/14 Mon
8:15-11:00*

6 6 Dr. Shipperman Wylie, Tweed, Wits analyses 11/11/14 Tues 10:15-13:00
 7 8 Dr. Friedlander Pathology in cephalometric radiographs 16/11/14 Sun
 13:30-16:00 or Wed 19/11/14
 8 7 Dr. Friedman Ricketts analysis including A-P analyses and A-Pog 17/11/14 Mon
 09:15-12:00
 9 9 Dr. M. Yitschaky Bjork and Jarabak analyses 23/11/14 Sun 10:30-12:30
 10 10 Dr. Friedman Visual Treatment Objectives & Growth Prediction 24/11/14 Mon
 10:15-13:00
 11 23 Dr. Shipperman Space Analysis: Basic principles and systems(2) 25/11/14 Tue
 08:00-10:00
 12 11 Dr. O. Yitschaky McNamara analysis 01/12/14 Mon 12:30-15:00
 13 12 Dr. Tendlich Introduction to Digital Photography 02/12/14 Tue 10:15-12:30
 14 14 Dr. Dykstein Principles of Orthodontic Photography 10/12/14 Wed
 13:15-16:00
 15 13 Dr. Weinberger Radiation Risk in cephalometry 14/12/14 Sun 11:30-13:00
 16 15 Dr. Katz Soft tissue & Air way analysis 16/12/14 Tue 10:00-12:30
 17 16 Dr. Katz Superimpositions 23/12/14 Tue 10:15-13:00
 18 17 Dr. Abed Computerized cephalometry - background 06/01/15 Tue 8:15-11:00
 19 18 Dr. Abed Computerized ceph/ & Imaging Exercise 13/01/15 Tue 8:15-11:00
 20 19 Dr. Hiler or Dr. Friedlander Computerized tomography (CT) basics and
 background 20/01/15 Tue 09:30-12:30
 21 20 Dr. Abed 3D cephalometry 27/01/15 Tue 10:15-13:00
 22 21 Dr. Abed Computerized Imaging & enhancing software 03/02/15 Tue
 08:15-11:00
 23 22 Dr. Shipperman Space Analysis: Basic principles and systems 10/02/15 Tue
 08:15-11:00
 24 24 Dr. Ross Computerized space analysis 25/02/15 Wed 13:15-16:00

Required Reading:

1+2

Required

1. S. Baumrind and R.C. Franz: The reliability of head film measurements:
 a. Landmark identification. AJO 60: 111-127, 1971.
2. A. Jacobson (ed): Radiographic Cephalometry from Basic to 3-D imaging ,2nd Ed
 2006 Ch. 3(33-43),
3. F.P.G.M. Van der Linden: A study of roentgenocephalometric bony landmarks.
 AJO 59: 111-125, 1971.

Optional

1. A. Jacobson (ed): Radiographic Cephalometry from Basic to 3-D imaging ,2nd Ed
 2006 Ch 4(53-61).

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Required

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1. A. Jacobson (ed): *Radiographic Cephalometry from Basic to 3-D imaging* ,2nd Ed 2006 Ch. 7(71-78)
 2. C.C Steiner: *Cephalometric for you and me*. A.J.Orthod 39: 729-755,1953.
 3. C.C Steiner: *The use of cephalometrics as an aid to planning and assessing orthodontic treatment*. A.J.Orthod 46: 721-735,1960.

Recommended

4. C.C Steiner *Cephalometrics as a clinical tool Vistas in Orthodontics* 1962

4

Required

1. A. Jacobson and RL Jacobson (ed): *Radiographic Cephalometry*, 2nd ed. 2006, ch. 6.
2. Downs WB: *Variations in facial relationships: their significance in treatment and prognosis*. Am J Orthod 34: 812-840, 1948.
3. Vorhies JM., Adams JW: *Polygonic interpretation of cephalometric findings*. Angle Orthod 21: 194-197. 1951.

Recommended

4. W.B. Downs: *Analysis of dento-facial profile*. AO 26: 191-212, 1956.
5. Y. Ben-Bassat, A. Dinte, I. Brin and E. Koyoumdjisky-Kaye: *Cephalometric Pattern of Jewish East European adolescents with clinically acceptable occlusion*. AJODO. 102:443-448, 1992.

5

Required

1. A. Jacobson (ed): *Radiographic Cephalometry from Basic to 3-D imaging* ,2nd Ed 2006 Ch. 15 (161-184)
2. Sassouni Analysis, in Enlow DH. *Facial Growth*. Ch 14, pp 378-380, 3rd ed, 1990
3. Sassouni V.: *A Roentgenographic cephalometric analysis of cephalo-facio-dental relationship*. A.j.orthod 41: 735-764,1955

Recommended

4. A. Jacobson (ed): *Radiographic Cephalometry from Basic to 3-D imaging* ,2nd Ed ch. 2 (13-31).

6

Required

1. Wits: A. Jacobson and RL Jacobson (ed), *Radiographic Cephalometry*. Quintessence. 2006, ch. 9
2. Jacobson A. *The "Wits" appraisal of jaw disharmony*. Am J Orthod Dentofacial Orthop 72: 1-22, 1977.
3. Tweed CH: *Was the development of the diagnostic facial triangle as an accurate analysis based on fact of fancy?* Am J Orthod 48: 823-840, 1962.
4. Tweed: A. Jacobson and RL Jacobson (ed), *Radiographic Cephalometry*.

Quintessence. 2006, ch.11

5. Baik CY, Ververidou M: A new approach of assessing sagittal discrepancies: the Beta angle. *Am J Orthod dentofacial Orthop* 126: 100-105, 2004.

Recommended

6. S. Haynes and M.N.Y. Chau: The reproducibility and repeatability of the Wits analysis. *AJODO* 107: 640-647, 1995.

7. S.E.Bishara. J.A.Fahi and L.C.Peterson: Longitudinal changes in the ANB angle and the Wits appraisal: clinical implications. *AJO* 84:133-139, 1983.

8. S. L. Sherman, M. Woods and R.S. Nanda: The longitudinal effects of growth on the Wits appraisal. *AJO* 93: 429-437, 1988.

9. C.H.Tweed: The FMIA in orthodontic diagnosis, treatment planning and prognosis. *AO* 24: 121-169, 1954

7

Required

1. Rocky Mountain – Data System Cephalometric Guide: From M-1 to P-9.

2. A. Jacobson and R. Jacobson: Radiographic cephalometry, Quintessence books, 2nd ed. 2006, Ch.8 pp.79-98.

3. R.M. Ricketts: Perspective in the clinical application of cephalometrics.: The first fifty years. *The Angle Orthodontist* 51: 115-150, 1981.

4. Pirttiniemi P. Miettinen J Kantoma T. Combined effect of errors in frontal-view asymmetry diagnosis. *Eur.J.Orthod* 18:629-636, 1996.

5. Proffit W R: Diagnosis and Treatment Planning Approches; Analysis of PA Cephalometric films. In: Proffit WR, White R P Jr. Sarver D M (eds) *Contemporary treatment of Dentofacial Deformity* C V Mosby, St. Louis, pp. 162 – 163.

Recommended

6. R.M.Ricketts, R.W.Bench, C.F.Gugino, J.J. Hilgers and R.J. Schulof: Bioprogressive Therapy. pp.55-59,1979.

8

Will be published later

9

Required

1. D.H. Enlow: *Facial Growth* 3rd ed. 1990, pp. 374-378.

2. A. Bjork: *The face in profile*. Ch. 5, 1947.

3. Bjork A: *The face in profile*. Abstracted by Salzman. *Am J orthod* 34: 691-699,1948.

Recommended

4. J. R. Jarabak: *Technique and treatment with the Light Wire Appliance*. 2nd ed. Ch.5 C.V.Mosby Co., St. Louis 1972, p.128-166.

10

Required

1. R.M. Ricketts: *Mechanisms of mandibular growth: A series of inquiries in the growth of the mandible*. In J.A. McNamara (ed): *Monograph 4, Craniofacial Growth Series*. Ann Arbor Center for Human Growth and Development, University of Michigan, 1975.
2. L.E. Johnston: *A simplified approach to prediction*. *Am J Orthod* 67: 253-257, 1975.
3. L.Z.Greenberg and L.E.Johnston: *Computerized prediction: The accuracy of a contemporary long-range forecast*. *Am J Orthod* 67: 243-252, 1975.
4. R.J. Schulhof and L. Bagha: *A statistical evaluation of the Ricketts and Johnston growth forecasting methods*. *Am J Orthod* 67: 258-276, 1975.
5. L.R. Leslie, T.E. Southard, K.A. Southard, J.S.Casko et.al: *Prediction of mandibular growth rotation: Assessment of the Skieller, Bjork and Linde-Hansen method*. *Am J Orthod Dentofacial Orthop* 14: 659-667, 1998.
6. Baumrind, Korn, West: *Prediction of mandibular rotation: An empirical test of clinical performance*. *Am J Orthod* 86: 371-385, 1984.
7. A. Jacobson and R. Jacobson: *Radiographic cephalometry*, Quintessence books, 2nd ed. 2006, ch. 24, pp.293-300.

Recommended

8. R.M.Ricketts, R.W.Bench, C.F.Gugino, J.J. Hilgers and R.J. Schulof: *Bioprogressive Therapy*. pp.35-54, 1979.
9. A. Jacobson (ed): *Radiographic Cephalometry*, ch. 22, pp.295-297, 1995.
10. A. Bjork: *Prediction of mandibular growth rotation*. *Am J Orthod Dentofacial Orthop* 55: 585-599, 1969.

11

Required

1. A. Jacobson and R. Jacobson: *Radiographic cephalometry*, Quintessence books, 2nd ed. 2006. ch. 10 pp.113-123: *McNamara Analysis*.

Recommended

2. J.A. McNamara: *A method of cephalometric evaluation*. *Am J Orthod* 86: 449-469, 1984.
3. L. Capellozza, G. de Araujo Almeida, R. Mazzottini, J. Cardoso Neto: *Mandibular relationships in patients with dentofacial deformities: Diagnostic criteria utilizing three cephalometric analyses*. *Int. J. Adult Orthod. Orthognatic Surg.* 1: 13-26, 1989.

12

Recommended

1. Korrodi Ritto: *Imaging in Orthodontics: Present and future*. J.C.Orthod 11 (619-625) 2002

13

Required

1. Rob Edwards: *Background radiation enough to trigger cancer*. New Scientist 11 January, 2003.

2. K.G. Issacson and A.R.Thom: *Orthodontic Radiographs: guidelines*. British Orthodontic Society, 2nd ed, 2001.

14

Required

1. Sandler J. Alison M.: *Cinical Photography in Orthodontics*. J. C. Orthod. Vol 11, 1997, 729-739.

2. P. Batra et al., *Clinical photography in the orthodontic office*, JCO Oct 2011, pp 569-578.

15

Required

1. A Jacobson and RL Jacobson (ed), *Radiographic Cephalometry*. Quintessence. 2006, ch 19.

2. Arnett GW, et al: *Soft tissue cephalometric analysis: Diagnosis and treatment planning of dentofacial deformity*. AJODO 1999;116:239-253.

3. Ackerman JL and Proffit WR. *Soft tissue limitations in orthodontic treatment planning guidelines*. AO 1997;67:327-336.

4. Bishara SE, Jacobsen JR, Hession TJ and Treder JE. *Soft tissue profile changes from 5 to 45 years of age*. AJO 1998;114:698-706.

Recommended

5. Sarver DM and Ackerman MB. *Dynamic smile visualization and quantification. Part I. Evolution of the concept and dynamic records for smile capture*. AJODO 2003;124:4-12.

6. Holdaway RA. *A soft tissue cephalometric analysis and its use in orthodontic treatment planning. Part I*. AJO 1983;84:1-28.

7. Holdaway RA: *A soft tissue cephalometric analysis and its use in orthodontic treatment planning. Part 2*. Am J Orthod 85: 278-293, 1984.

8. Burstone CL. *Lip posture and its significance in treatment planning*. AJO 1967;53:262-284.

9. Burstone CJ: *The integumental profile*. Am J orthod 44: 1-25, 1958.

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10. Hillesund E, Fjeld D, Zachrisson BU: Reliability of soft tissue profile in cephalometrics. *AJO* 75(5):537-550, 1978
 11. Facial esthetics. *JCO* interview with CJ Burstone. *JCO* 41(2):79-87, 2007.
 12. Park YC, Burstone CJ. Soft tissue profile fallacies of hard tissue-standards in treatment planning. *AJODO* 1986;90:52-62.
 13. Peck H, Peck S: A concept of facial esthetics. *Angle Orthod.* 40: 284-318, 1970.

Airway

Required

14. McNamara JA. Airway analysis. In: A Jacobson and RL Jacobson (ed), *Radiographic Cephalometry*. Quintessence. 2006, pp 122-123.
15. Ricketts analysis in A Jacobson and RL Jacobson (ed), *Radiographic*
16. *Cephalometry*. Quintessence. 2006, p. 86
17. Klumper GT et al. Naso-respiratory characteristics and cranio-facial morphology. *EJO* 1995;17:491-495.

Recommended

18. Gavish A et al. Cephalometric and polysomnographic analysis of functional magnetic system therapy in patients with obstructive sleep apnea. *AJODO* 2001;120:169-177.
19. Wyche CJ, Wilmot JJ, Brooks SL. Frequency of radiographic turbinate bones on lateral cephalometric radiographs. *AJODO* 1995;108:56-61.
20. Preston CB, Lampasso JD, Tobias PV: Cephalometric evaluation and measurement of the upper airway. *Seminars in Orthodontics* 10(1): 3-14, 2004.

16

Required

1. S. Baumrind, D. Miller and R. Molthen: The reliability of head film measurements. Part 3. Tracing superimposition. *Am J Orthod* 70: 617-644, 1976.
2. (1) R.M.Ricketts: A four step method to distinguish orthodontic changes from natural growth. *JCO* 208-228, 1975.
- (2) S.D. Springate, A.G. Jones: The validity of two methods of mandibular superimposition: A comparison with tantalum implants. *Am J Orthod Dentofacial Orthop* 113: 270 (commentary by R.M.Ricketts), 1998.
3. A.Bjork: Normal and abnormal growth of the mandible. A synthesis of longitudinal cephalometric implant studies over a period of 25 years. *Europ J Orthod* 5: 40-44 (appendix), 1985.
4. S. Baumrind, Y. Ben-Bassat, E.L. Korn, L.A. Korn, L.A. Bravo and S. Curry: Mandibular remodelling measured on cephalograms: part 2. A comparison of information from implant and anatomical best fit superimpositions.
5. *Am J Orthod Dentofacial Orthop* 102: 227-238, 1992.
6. Nielsen IL. Maxillary superimposition: a comparison of three methods for cephalometric treatment changes. *Am J Orthod Dentofacial Orthop*, 1989, 95: 422-31.

7. D.M. Doppel, W.M. Damon, D.R. Joondeph and R.M. Little: An investigation of maxillary superimposition techniques using metallic implants. *Am J Orthod Dentofacial Orthop.* 105: 161-168, 1994.

17

Required

1. A. Jacobson (ed): *Radiographic Cephalometry from Basic to 3-D imaging*, 2nd Ed Ch.. 20 (219-231) & Ch. 21 (233-247) & Ch. 22(249-266).

Recommended

2. Graber T.M : *Orthodontics: Current principles and Techniques*.3th Ch 8 (353-374)

3. Ongkosuwito EM, Katsaros C, van 't Hof MA, Bodegom JC, Kuijpers-Jagtman AM.: The reproducibility of cephalometric measurements: a comparison of analogue and digital methods. *Eur J Orthod* 2002 Dec;24(6):655-65

4. Schulze RK, Gloede MB, Doll GM.:Landmark identification on direct digital versus film-based cephalometric radiographs: a human skull study. *Am J Orthod Dentofacial Orthop* 2002 Dec;122(6):635-42

5. Geelen W, Wenzel A, Gotfredsen E, Kruger M, Hansson LG: Reproducibility of cephalometric landmarks on conventional film, hardcopy, and monitor-displayed images obtained by the storage phosphor technique. *Eur J Orthod* 1998 Jun;20(3):331-40

6. Forsyth DB, Davis DN.: Assessment of an automated cephalometric analysis system. *Eur J Orthod* 1996 Oct;18(5):471-8

7. Power G, Breckon J, Sherriff M, McDonald F.: Dolphin Imaging Software: an analysis of the accuracy of cephalometric digitization and orthognathic prediction. *Int J Oral Maxillofac Surg.* 2005 Sep;34(6):619-26

8. Chen YJ, Chen SK, Yao JC, Chang HF: The effects of differences in landmark identification on the cephalometric measurements in traditional versus digitized cephalometry.*Angle Orthod.* 2004 Apr;74(2):155-61.

18

Required

1. Halazonetis DJ.: Computer-assisted cephalometric analysis. *Am J Orthod Dentofacial Orthop* 1994 May;105(5):517-21

2. Demetrios J. Halazonetis: Morphing and Warping. Part I *Am J Orthod Dentofacial Orthop.* April 1999 • Volume 115 • Number 4 • p466 to p477

19

Will be published later

20

Will be published later

21

Required

1. Demetrios J. Halazonetis, DMD, MSA, Martin N. Abelson, AB, DDS, ABOB: Digital image processing: How to retouch your clinical photographs, *American Journal of Orthodontics and Dentofacial Orthopedics*, October 2000, Volume 118, Number 4, p469 to p475.

Recommended

2. Michael L. Swartz: *Managing digital images*,
American Journal of Orthodontics and Dentofacial Orthopedics,
September 2000, Volume 118, Number 3, p354 to p358.

22+23

Required

1. W.Proffit and H.W. Fields: *Contemporary Orthodontics*. 3rd ed, Ch.5, p.128-131, Ch.6, p.165-170. Mosby Co. 2000.
2. M.M.Tanaka and L.E. Johnston: *The prediction of the size of unerupted canines and premolars in a contemporary orthodontic population*. *J. Am. Dent. Assoc.* 88:798-801, April 1974.
3. Hixon E., Oldfather R. *Estimation of the sizes of unerupted cuspid and bicuspid teeth*. *Angle Orthod.* 1958, 28/4: 236-240.
4. Staley R., *A revision of the Hixon - Oldfather mixed dentition prediction method*. *AJODO*, 1980; 78.
5. Gardner R.A *comparison of 4 methods of predicting arch length*. *AJODO*, 1979; 75/4: 387-398.
6. Y.Zilberman, E. Koyoumdjisky-Kaye and A.Vardimon: *Estimation of mesiodistal width of permanent canines and premolars in early mixed dentition*. *J. Dent. Res.* 56(8),1977.
7. T.M.Grabner, R.L.Vanarsdall: *Orthodontics, Current Principles and Techniques*. 3rd ed. Ch. 16, pp.772, Mosby Co. 2000
8. W.A. Bolton: *Disharmony in tooth size, its relation to the analysis and treatment of malocclusion*. *AO*:28, pp.113-130. 1958
9. Bolton W. *The clinical applications of a tooth size analysis*. *Angle Orthod.* 1962, 48/7: 504-529.
10. S.S.Smith, P.H.Buschang and E.Watanabe: *Interarch tooth size relationships of 3 populations: "Does Bolton's analysis apply?"* *Am J Orthod Dentofac Orthop* 117: 169-174, 2000.

24

Will be published later

Course evaluation: Written and practical test

Additional Reading Material:

None

Course/Module evaluation:

End of year written/oral examination 80 %

Presentation 0 %

Participation in Tutorials 10 %
Project work 10 %
Assignments 0 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:
None