"30 Questions That Every Dentist Should Ask About Temporomandibular Disorders, And Where To Find The Answers?"

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This summary of "TMDs" is composed of information from Dr. Tanaka's teaching manual for graduate students (7th ed. under revision) and represents the current thinking in the current and past literature.

Special thanks are noted for the valuable contributions of Dr. Okeson and his text, and Dr. Reny de Leeuw's, "AAOP Pain Guidelines."

Dr. Tanaka's comments are based upon more than 40 years in dental education and having served as the director of 'Pain Clinic Teams" at the School of Medicine, University Hospital, University of California, San Diego, and the University of Southern California School of Dentistry, Facial Pain Clinic. This summary of the current thinking on TMDs will start with two quotes about the TMD literature:

" Read not to confute, nor to take for granted,
but to weigh and consider." *(Francis Bacon)*

"What we see is determined by what we know, *(Goethe)*
but sometimes, it's what we think we know that keeps us from learning more."*(J. Okeson)*

1. What are TMDs?

Temporomandibular Disorders (TMDs) is a collective term that embraces a number of clinical problems that involve the masticatory muscles, the TMJ, and the associated structures."
"TMDs are considered to be a subclassification of musculoskeletal disorders."
Bell's Orofacial Pain ed.5, by Okeson

2. TMD - What are the recommended reading references:

- **Management of Tempormandibular Disorders and Occlusion 6th ed. *Jeffrey Okeson DMD,*** *CV Mosby Co.*
- **Orofacial Pain - Guidelines for Assessment, Diagnosis, and Management.** ***Edited by Reny de Leeuw, DDS, PhD***
- **Significant authors: *Okeson;Lavigne;Dao; Gibbs; Lundeen; Mahan;McNeill;Auvenshine; Palla; Behrents;Lobezzo; Woda;Sessle;Celenza, and others.***

3. Epidemiology: Who do TMDs affect: males and females?

•**Gender**: TMDs affect women 2X more than men. (Tanaka 6:1 USC Pain Clinic)
LeResche L 1997 Crit Rev Oral Biol Med; 8:291-305; Anastassaki A, Magnusson T 2004 Acta Odontol Scan;62: 183-192
•USA Pain Clinics - 3:1 to *(TTT 6:1,)* females to males

•**Gender:** *Dao TT Text Orofacial Pain, Sessle B et al Chap.13. Pain and Gender Thuan T.T. Dao, DMD, MSc, PhD, FRCD(C)*
•*Women had more headaches, clicking, TMJ tenderness and muscle tenderness than men.*
Levitt,McKinney1994;Centore et al 1989; Skeppar,Nilner 1993

4. Epidemiology: how often do TMDs occur in non-patient populations?

•40-75% of "*selected"* adult *populations* have at least one sign of joint dysfunction (eg, movement abnormalities, *joint sounds*, tenderness on palpation, and...

•33% of "*selected" non-patient populations* have at least one symptom of dysfunction, (eg, face pain or joint pain.
•*Schiffman E, et al; DeKanter RJAM 1993 et al; Dworkin SF et al 1990*

5. What is the significance of TM Joint Sounds?
"Joint sounds appear to be relatively common in healthy populations: joint sounds or deviations on mouth opening occur in approximately **50% of non-patient samples."**
REF. Orofacial Pain: Guidelines for Assessment, Diagnosis and Management, American Academy of Orofacial Pain, Reny de Leeuw 2008 Quintessence Publishing Co

6. What do the "TMJ clicking" studies show us?

- *Only 7% of a patient population with benign TMJ clicking showed progression to bothersome clicking status over a 1- 7.5 year period." (Randolph,Perry AJO 1990)*

•*"While clicking is fairly common, the progression to a potentially more serious nonreducing disc status is relatively uncommon." Wabake 1994;Huber 1990; magnusson T,Carlsson G 1994;Lundh et al1987*
** *"Because joint sounds are common, often pain free, and not progressive, it is important to avoid overtreatment of benign chronic reducing and nonreducing disc displacement in the absence of pain and impairment."*
AAOP Guidelines 2008- Reny de Leeuw

7. "Is there a clear correlation between clinical signs and symptoms?
(No) *AAOP Guidelines 2008 Reny de Leeuw*

8. What findings are consistent in the literature?

- TMJ pain is reported in approximately 10% of the population older than 18 yrs.
- TMJ pain is primarily a condition of young and middle-aged adults.
- TMJ pain is twice as commen in women than men. *(TTT our pain clinic stats are closer to 6:1)*
- *Refs. LeResche; Anastassaki, Magnusson*

9. What are other important findings: (from the AAOP Guidelines)

- TMDs are often remitting, (having periods of abatement and or exacerbation) *Dorland Medical Dictionary)*
- TMDs are self limiting
- TMDs fluctuate over time
  Refs.Randolph, Perry 1990; Nickerson JW, Boering G 1989

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10. What is the long term prognosis of temporomandibular disorders?
The conclusions of a major study of "Temporomandibular Joint Osteoarthrosis"was undertaken by Dr.Geert Boering, and presented as a thesis for the degree, Doctor of Medicine in 1966. This work was followed up in 1993 with a publication by Drs. Boering, de Leeuw, Nickerson, Egermark et al. Their conclusions were based upon the remaining 100 living patients of that study.
Their findings and conclusions remain the most influential work dentists should consider when considering the natural history of temporomandibular disorders.
Dr. deLeeuw states that,
"While knowledge of the natural history or course of TMDs is limited, there is increasing evidence that progression to chronic and disabling intracapsular TMJ disease is uncommon."

11. Do osteoarthritic changes increase with age?
- Yes, but pain and dysfunction does not increase with age. *Boering et al*
- Osteoarthritic changes and tooth loss increase with age.

12. Does the frequency of morphologic irregularities and physical limitation increase with age?
- *Frequency of morphologic irregularities increases with age. Widmam;Pereira;Tanaka*
- *Physical limitations and dysfunction steadily decrease in prevalence and severity with age. Levitt,McKinney; Koidis; Kaunisaho K*
- *Progression to severe pain and dysfunction of the TMJs was rare. Magnusson T,Egermark I, Carlsson G,2000;2005*

13. Is the severity of pain the same across all age groups?
Pain severity is the same across all age groups. *Levitt & McKinney 1994*

14. What other clinical signs are seen in patients with TMDs?
- Other signs are relatively rare: mouth opening limitations occur in less than 5% of non-patient populations."*DeKantor;Dworkin;Wabeke*
- ** Despite the large percentages of the population having signs of TMJ dysfunction, the overall prevalence of TMD complaints in a general population is very small.
- *** Only 3,6% to 7% of these individuals are estimated to be in need of treatment." The annual incidence rate is 2%." *Rugh;Schiffman;DeKanter;Dworkin; Von Korff*

15. What should the dentist know about central and centrally mediated pain, neuropathic pain?
Sessle;Okeson; de Leeuw.
*** TTT, "This area of study can become very complex, requiring a greater understanding of neurology and pain pathways. I would recommend purchasing Okeson's textbook (CV Mosby Co), which provides a more in depth explanation of current thinking re. these topics."*
- ***TTT, " The book "AAOP Guidelines for Orofacial Pain" published by Quintessence and edited by Dr. Reny de Leeuw is the best summary review of these topic."s*

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16. What causes TMDs? (Etiology) ***(AAOP, American Academy of Orofacial Pain)***
When considering the etiology of any clinical problem, one should consider the following three factors:

- Predisposing factors -"factors that increase the risk of TMDs." (systemic disease RA, *occlusal disorders?)*
- Initiating factors - "factors that cause the onset of TMDs." (direct trauma,indirect or microtrauma eg. clenching,bruxing)
- Perpetuating factors - "factors that interfere with healing or enhance the progression of TMDs." (systemic disease, auto-immune disorders, disc perforation, C.T. breakdown and cortical thinning with cortical perforations, inflammation)

17. Are Occlusal Relationships related to Temporomandibular Disorders? Yes and No.
*Are occlusal discrepancies between centric relation and intercuspal position the predisposing, initiating, and perpetuating factors for TMDs?"
"The literature and current studies do not strongly support these beliefs in all instances."
AAOP Guidelines 2008 and other references:

•*Magnusson T, Carlsson G, et al1994; Verdonck A et al 1994;*

•*McNamara,Seligman,Okeson 1995 J Orofacial pain; Seligman, Pullinger, 1996; JPD 83;p66-75 2000; JPD 83: 76-85 2000.*

•*DeBoever JA C,Carlsson G, Klineberg I., J Oral Rehabil, 2000 27:367-379*

•***Dr. Jeffrey Okeson has compiled a very complete review of this subject that is published in the 6th edition of his textbook, "Management od Temporomandibular Disorders and Occlusion."***
This text is highly recommended for all dentists.

18. Is there an association between TMDs and lost molar support?

- Studies of living nonpatient populations do not provide evidence of an association between TMDs and lost molar support." *(TTT, "especially if the patient does not engage in oral habits such as clenching and bruxing .In patient who do clench and or brux, the occlusal forces may be less as one reaches the anterior of the mouth, but the forces on the TMJ structures will increase as the patient clenches.")*
- *Swanljung O,Rantanen T. Community Oral Dent Oral Epidemiology,1979 l7: 177-182*
- *Holmlund A, Axelsson S. Acta Odontol Scand 1994;52:214-218*
- *Witter DJ, et al J Oral Rehabil 1994; 21: 353-366*

19. Do changes in OVD of 4-6mm lead to TMDs?

- "Moderate changes in the OVD of 4-6mm do not lead to muscle hyperactivity or TMD symptoms." *Rivera-Morales, Mohl, J Prosthet Dent 1991;65: 547-553*
- "No recent studies with regard to the impact of vertical dimension on TMDs were found in the English-language literature." *DeLeeuw 2008, 21.*
- *** TTT, It is only in rare instances (one patient in 100, that requires rehabilitation), that the patient will require an OVD increase of 3-4mm between the second molars, when performing a complete rehabilitation. (see OVD in Tanaka text (manual for graduate prosthodontics.)*

20. **Is a deep anterior overbite (vertical overlap) related to TMDs?**

•Extensive overbite - (vertical overlap of the anterior teeth has been associated with TMDs.

•*(2 studies, the best so far, but not thoroughly convincing.)*
*(a review):*Seligman, Pullinger, J Craniomand Disord Facial Oral Pain, 1991;5: 96-106*
** Seligman D, Pullinger A J Prosthet Dent 1988; 58: 483-489*

• *There are an equal number of studies that have found no association*

• *TTT, Studies of "vertical overlap," or "overbite," must be separated into Class II Div.I, or Class II Div.II. (See Tanaka text,7th ed.)*

21. Is there evidence that extensive overjet (horizontal overlap) is associated with TMDs?

•Extensive overjet (horizontal overlap of anterior teeth has been associated with TMD symptoms and OA changes.) *Riolo J Orthod 1987; Heloe B Scand 1980.*

•*There is more convincing evidence that the extensive overjet is the result of developmental eruption patterns and skeletal facial patterns. How these Class II skeletal factors affect the anterior guidance and TMJ function and TMDs is questionable at this time. (Tanaka)*

22. CR to ICP(MIP) slides: Are the anterior and antero-lateral slides from centric relation to the intercuspal position the primary etiology of TMDs?

• CR to ICP slides in excess of 2mm have been implicated as etiologic factors for TMDs in several studies only. However, more important than the degree of the slide is the question, *"is the patient engaging in any oral habits such as clenching and or bruxing?"*

•***"Therefore, the answer is, "It isn't the degree of the slide as much as what the patient does with the slide?"(If the patient doesn't clench or brux, they most likely will not experience any pain or dysfunction)***

•

• CR to ICP (MIP) slides occur in over 90% of individuals. *Posselt*

• 90% of individuals do not have TMD pain or dysfunction. *Okeson, Mahan, McNeill, Tanaka, Fricton, Mohl*

•**Conclusion:**

•"It is not the degree of the slide. The pain and dysfunction depends upon what the patient does with the slide." Eg, clench and brux. *Tanaka, Okeson*

"If the patient does not parafunction, eg., clench or grind, they will most likely not experience any pain or dysfunction."

23. Are balancing side (non-working side) tooth contacts contributing to TMDs and should they be removed?

- ***No,*** *balancing side tooth contacts have been removed without considering clear evidence that they are the result of a lack of canine guidance on the working side. The treatment for the presence of balancing side tooth contacts, is to build up the inter-canine contacts on the working side, either orthodontically or by restoration, (e.g. addition of a restorative material on the*

lingual of the maxillary canine and or mandibular canine.)
Tanaka TT. 1964, 1985 ACP

Management of TMDs:

24. How effective are current electronic devices in diagnosing TMD patients from asymptomatic individuals?

•**Make a diagnosis based upon science:** understand that Pantography, Sonography, JVA, EMG and other instrumentation are only helping us hear the joint sounds more clearly , and to track the jaw movements. The increased clarity of the TMJ sounds does not mean that the TMJ is painful and or dysfunctional, and requires treatment. These instruments lack "specificity" and good science. These instruments are frequently used to "convince" the patient without pain or dysfunction, that he/she needs a splint, an occlusal equilibration , or a complete rehabilitation and multiple crowns

25. Is Occlusal adjustment recommended as a primary goal to eliminate TMD muscle pain? **No, *occlusal adjustment in the presence of muscle and or joint pain is not recommended except in rare instances. The painful muscles (myofacial pain) involves protective muscle co-contraction which alters the inter-arch occlusion and the ability to achieve an accurate Centric Relation position. Tanaka, Okeson ** "Establish the proper musculoskeletal diagnosis first and relieve the pain and dysfunction with a reversible procedure first (e.g. splint therapy), before proceeding with an irreversible procedure like an occlusal adjustment."*

26. TMD Management: Is Splint Therapy effective for the management of TMDs?

- *Read the article by TT Dao, Lavigne, Feine, Lund in the (Journal of Pain 1994)* to better understand why splints(orthotics) are effective in relieving myofacial pain or view the DVD,
- "ABC's of Splint Therapy" DVD - Tanaka Educational Library www.TerryTanakaDDS.Com

- "Splint therapy" is an important part of the therapeutic regimen and one of the most effective tools for the management of muscle disorders and TM joint disorders.
- "Splint therapy" should be among the first treatment choices because it is a simple, cost effective and reversible procedure that will not alter the occlusion (if applied properly) and will not further complicate the management of the pain disorder.

- ***"Occlusal adjustment" should rarely be attempted in the presence of pain and dysfunction.***
- Relieve the pain and dysfunction with splint therapy and analgesics first, and then reconsider whether occlusal adjustments are even necessary.

27. What kinds of splints are recommended for myofacial pain?
See chapter on Splint Therapy in Tanaka text. 7th ed.

28. What kinds of splints are recommended for occlusal disorders?

29. Pharmacology: what medications are recommended for muscle and joint disorders, what dosage, and how long should they be taken? *(See chapter on pharmacology for orofacial pain, Tanaka text))*

30. TMD Management Summary: Start with the most conservative reversible therapy first.

•(e.g.Full-arch stabilizing splints, Physical Therapy, Chiropractic(Active Release), behavioral therapy may be followed by occlusal therapy when indicated.

**** What can the dentist do to learn more about temporomandibular disorders and to remain current with the knowledge of orofacial pain disorders?**

Read science-based textbooks and peer-reviewed journals:

a. Journal of Orofacial Pain- phone 800-621-0387

b. Management of Tempormandibular Disorders and Occlusion 6th ed. *Jeffrey Okeson DMD, 6th ed.CV Mosby*

c. Orofacial Pain - Guidelines for Assessment, Diagnosis, and Management. 4th ed. *Edited by Reny de Leeuw, DDS, PhD Quintessence*

d. Orofacial Pain: From Basic Science to Clinical Management, *Barry Sessle, Lavigne,Dao Okeson, 2nd. ed., Quintessence*

e. DVD Series: Dissections of the Head, Neck and TMJ; Advanced Dissections of the TMJ; TMJ Microanatomy; TMJ Radiography, "Treatment Planning, Restorative and Occlusal Therapy Series." *Tanaka, TT: Tanaka Educational Library www.TerryTanakaDDS.Com*

**** The material above is an abbreviated summary for Dr. Tanaka's full day lecture and text(manual) for graduate students at the University of Southern California). More complete information is available in the DVDs and the Tanaka text(manual 6th ed.) in the *Tanaka Educational Library* on his website at www.TerryTanakaDDS.Com.**

**** The educational DVDs of Restorative and Occlusion Guidelines, Treatment Planning and TMJ Dissections that are used in over 80 dental schools and surgery programs are available on this website.**

**** NEW DVDs: in 2011**

(1)*"Problem Solving Guidelines for Restorative Dentists" DVD series* will be available in June, 2011

(2) *"Implant Surgery: Advances and Complications" will be available in October 2011*

****TANAKA, TEXT(MANUAL 7TH Ed):**

The 7th edition of the Tanaka Text is a working manual designed for graduate students in Graduate Prosthodontics, Endodontics, Periodontics and General Dentists. It is currently undergoing revision and will be available in August-September, 2011.

****A NEW schedule of interactive eCourses with Dr. Tanaka are being planned at this time. Watch the website, at www.TerryTanakaDDS.com**

"Best wishes for a happy and healthy 2011."

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