

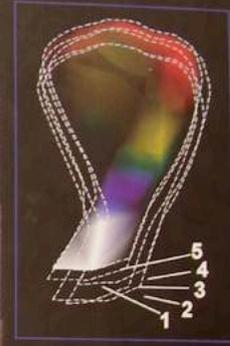


# TEMPOROMANDIBULAR DISORDERS, OCCLUSION, SPLINT THERAPY

TMDI

(TEMPOROMANDIBULAR DISORDER  
INDEX)

# Science and Practice of Occlusion



Edited by  
Charles McNeill, DDS

**qb**  
quintessence  
books

## *“Science and Practice of Occlusion:*

is based on the theme that occlusion is a functional outcome of, or input to, the interaction of the stomatognathic structures. This includes the coordinated functional interaction between the various cell and tissue populations forming the stomatognathic system as they differentiate, model, remodel, fail, and/or repair. The science of occlusion encompasses anatomic, biomechanic, physiologic, and pathologic principles.”

(Charles McNeill, DDS.  
Science and Practice of Occlusion.)

Management of  
**TEMPOROMANDIBULAR  
DISORDERS  
AND OCCLUSION**

JEFFREY P. OKESON



ELSEVIER

# Functional Anatomy

“The masticatory system is extremely complex. It is primarily made up of bones, muscles, ligaments, and teeth. Movement is regulated by an intricate neurologic controlling mechanism. Each movement is coordinated to maximize function while minimizing damage to any structure. Precise movement of the mandible by the musculature is required to move the teeth efficiently across each other during function.

Continued...

# Functional Anatomy

The mechanics and physiology of this movement are basic to the study of masticatory function. Part I consists of six chapters that discuss the normal anatomy, function, and mechanics of the masticatory system. Function must be understood before dysfunction can have meaning.”

(Jeffery P. Okeson, DMD.  
Management of Temporomandibular  
Disorders and Occlusion)

# WHERE ARE WE NOW?

- ▶ We have not succeeded in answering all of our problems; indeed, we often feel we have not answered any of them! The answers we have found only serve to raise a whole new set of questions. In some ways, we feel we are as confused as ever; but we believe we are confused on a much higher level and about more important things.
- ▶ Linus to Charlie Brown

# Cause and Effect Relationship?

- ▶ The confusion and controversy concerning the relationship between occlusion and TMD continues. The general message is that there is no simple cause-and-effect relationship explaining the association between occlusion and TMD.

- ▶ (Okeson 105)

# Occlusal Signs and Symptoms

- ▶ Most clinicians would also agree that ... occlusal conditions .... do not always lead to TMD symptoms. In fact, these findings are commonly seen in symptom-free populations. To appreciate the role of occlusion in TMD, one must better understand the many factors that can influence function of this extremely complex system.
- ▶ (Okeson 107)

# Occlusion/TMD/Masticatory system

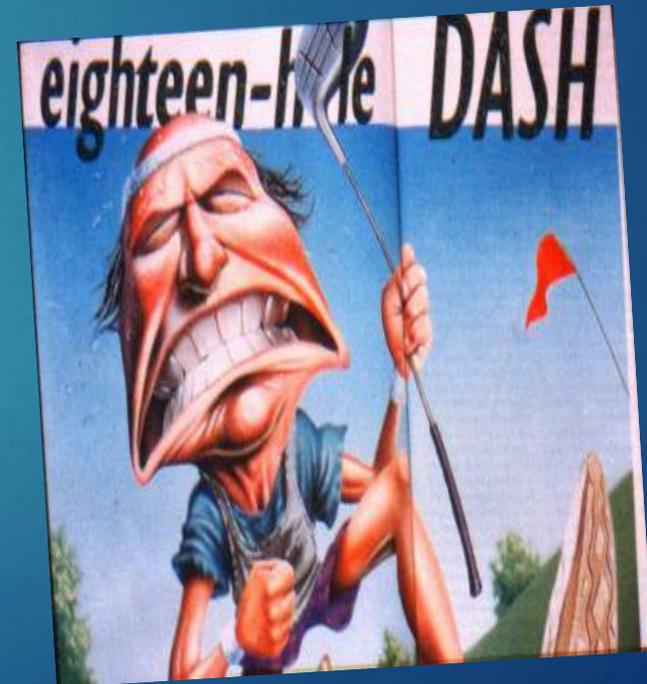


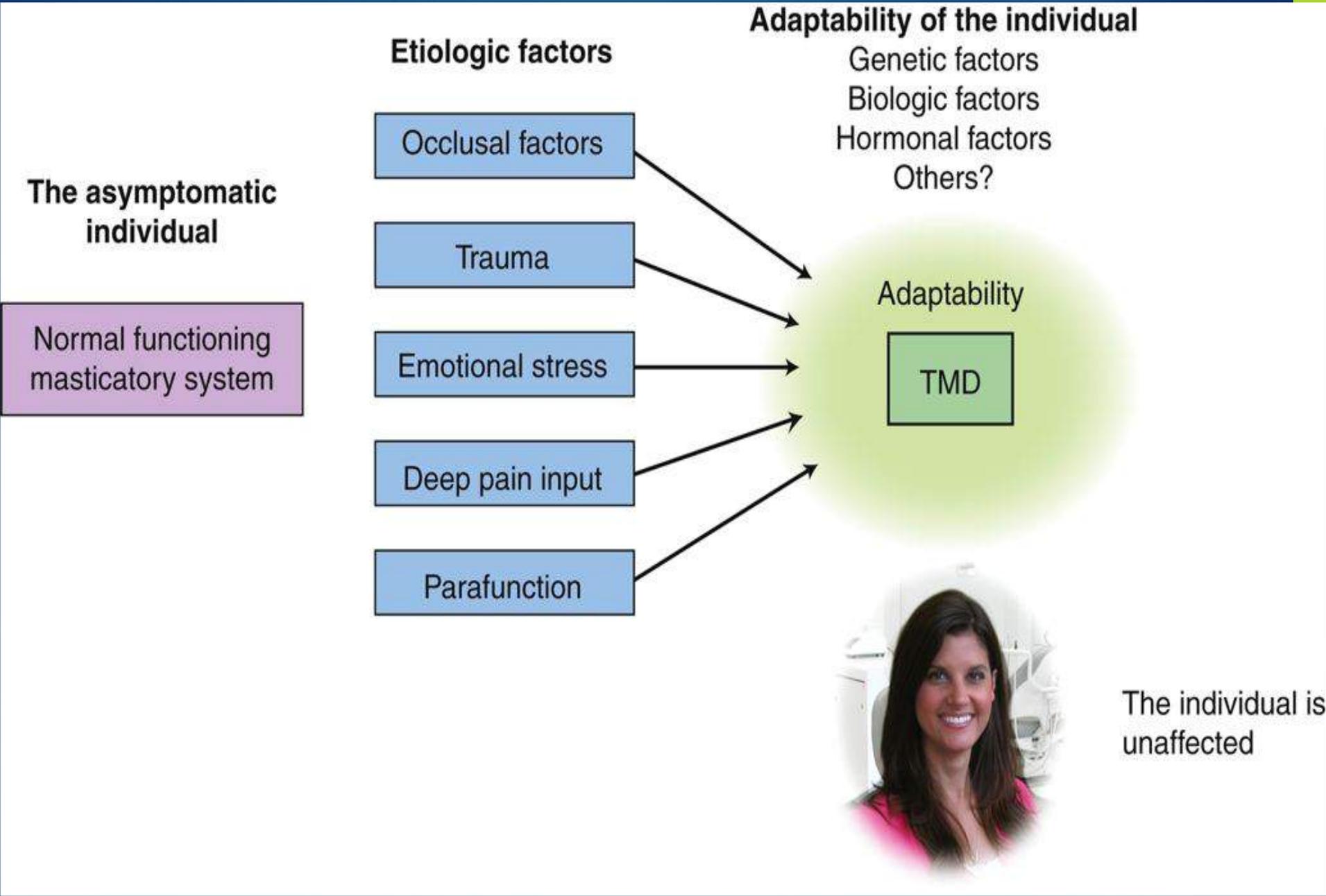
” The clinician who only looks at occlusion is missing as much as the clinician who never looks at occlusion.”

Okeson

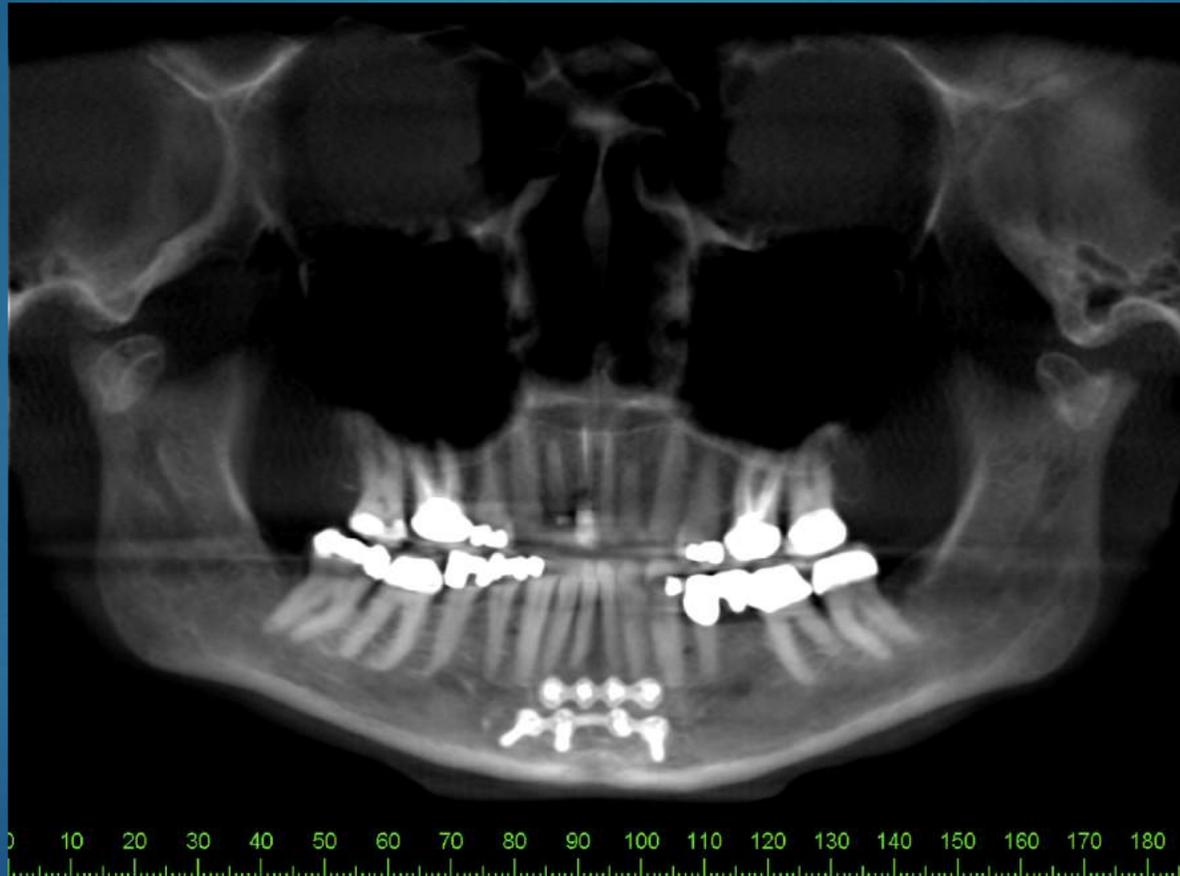
# FACTORS CONTRIBUTING TO TEMPOROMANDIBULAR DISORDERS

1. TRAUMA
2. PARAFUNCTIONAL HABITS
3. EMOTIONAL STRESS
4. OCCLUSAL IMBALANCE
5. SYSTEMIC DISEASE
6. SLEEP DISORDERS





# Bilateral Subcondylar Fracture from Blunt Trauma to Symphysis.



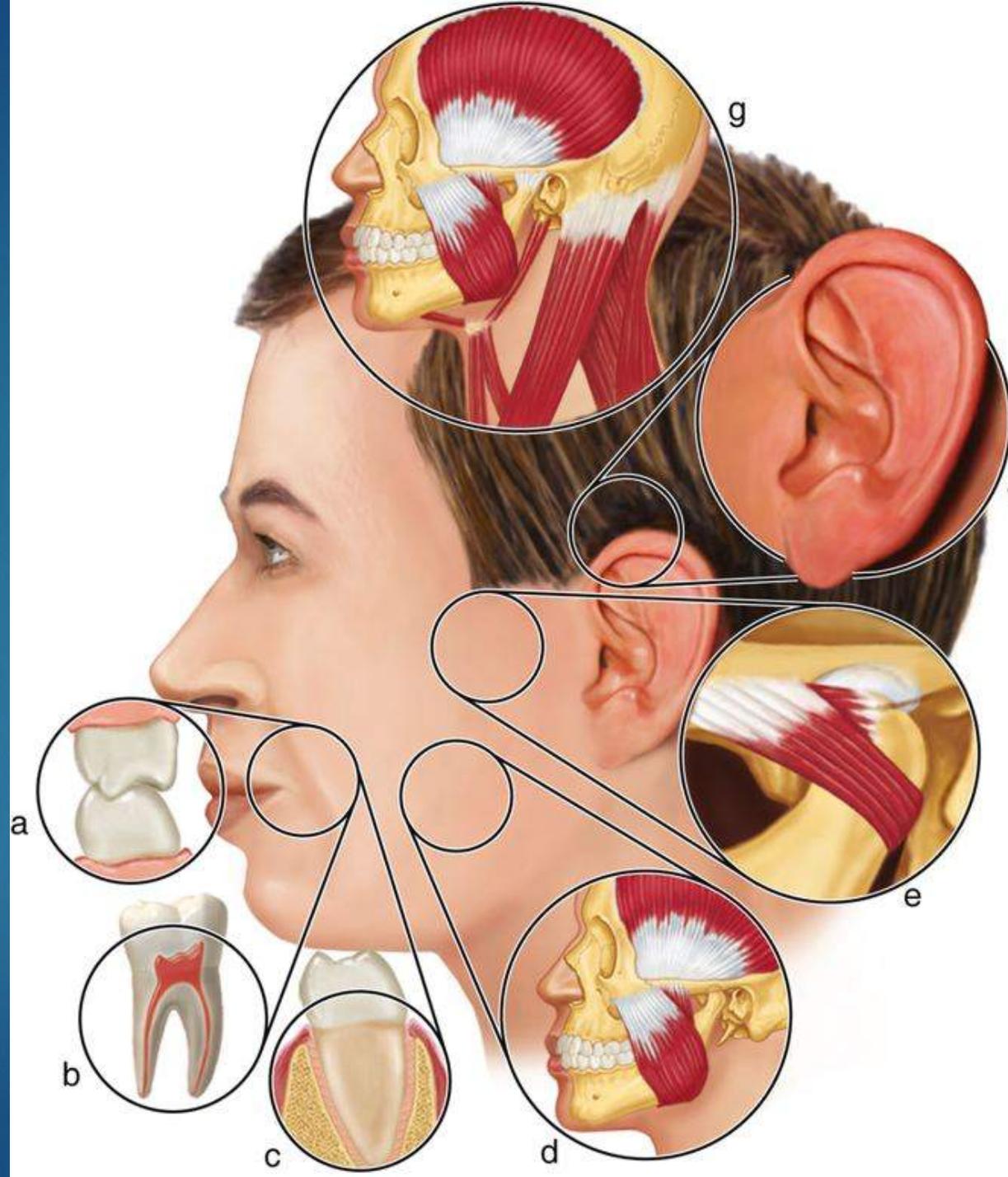
# Occlusal Contacts and Muscles

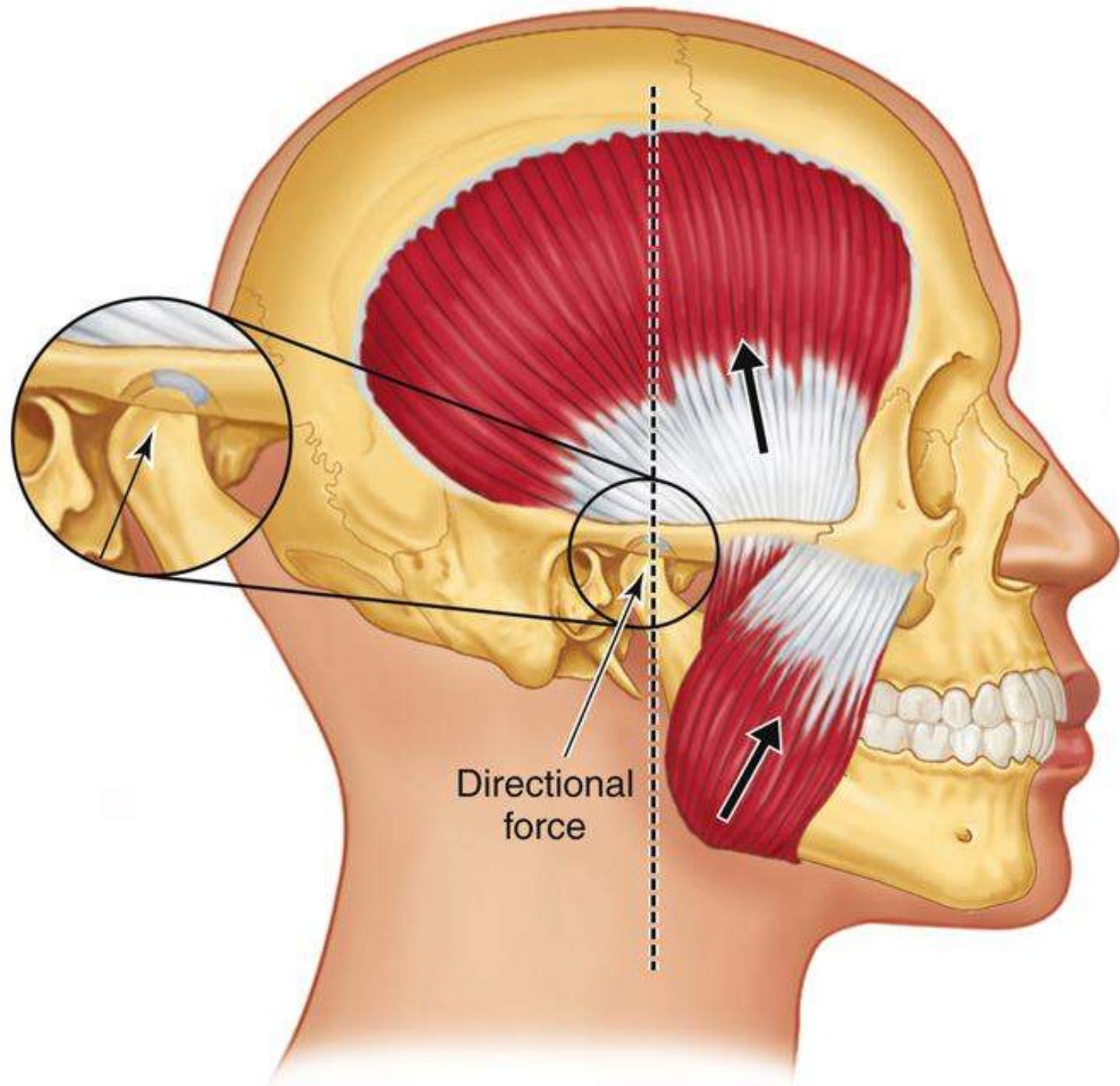
- ▶ The occlusal contact patterns of the teeth will influence the precise functional activity of the masticatory muscles. However, does this mean that occlusal contacts are related to masticatory muscle pain?
- ▶ (Okeson 120)

- 
- ▶ If occlusion does play a significant role in the etiology of TMD, the dentist can and should play an important role in the management of these disorders. No other health care providers can provide this treatment.
  - ▶ (Okeson 103)
  - ▶ Okeson, Jeffrey P. *Management of Temporomandibular Disorders and Occlusion, 7th Edition*. Mosby, 052012. VitalBook file.

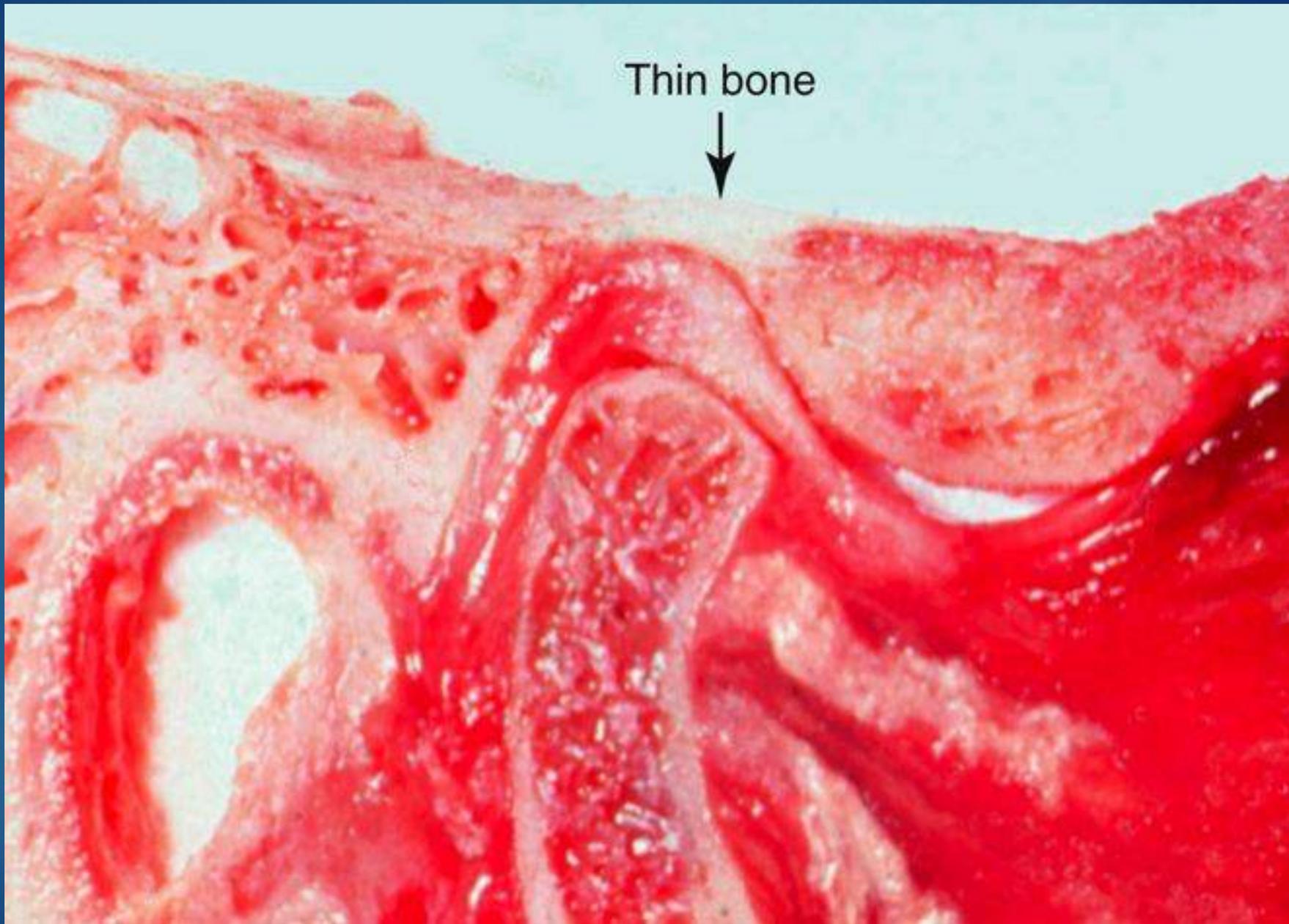
# Occlusion and TMD

- ▶ If occlusion plays no role in TMD, any attempt by the dentist to alter the occlusal condition is misdirected and should be avoided.
- ▶ (Okeson 103)
- ▶ Okeson, Jeffrey P. *Management of Temporomandibular Disorders and Occlusion, 7th Edition*. Mosby, 052012. VitalBook file.

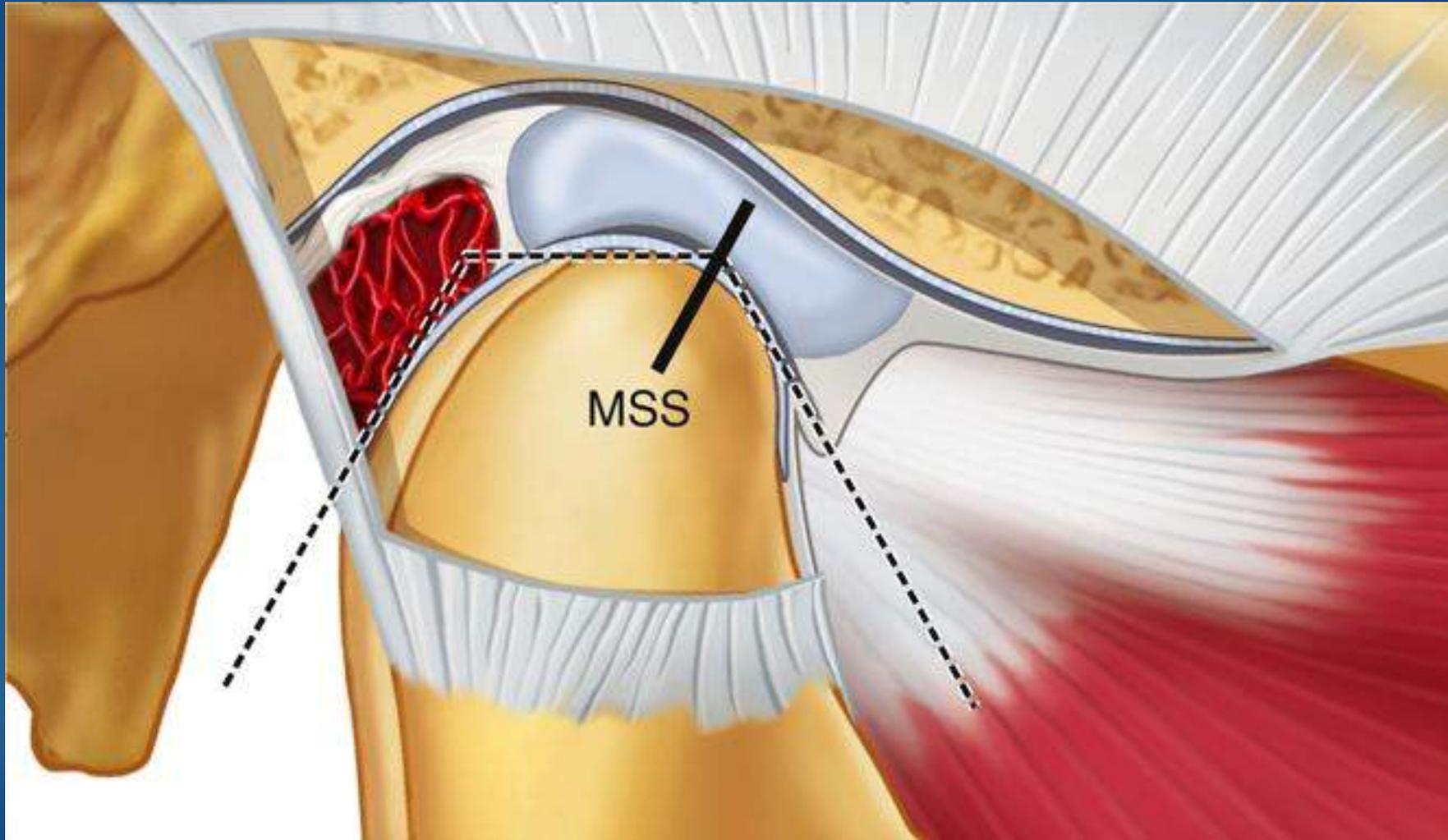




Thin bone



# Musculoskeletally Stable Position



# Occlusion and Muscle Hyperactivity

- ▶ On reviewing the literature, it becomes obvious that the precise effect of the occlusal condition on muscle hyperactivity has not been clearly established. It appears to be related to some types of muscle hyperactivity and not to others. Yet this confusing issue is the essence of how dental therapy either fits or does not fit into the management of masticatory pain disorders.
- ▶ (Okeson 120)

# Muscle Hyperactivity

- ▶ *muscle hyperactivity* is an inclusive term referring to any increased level of muscle activity that is NOT associated with a functional activity. This includes not only bruxism and clenching but also any increase in muscle tonicity related to habits, posture, or increased emotional stress.

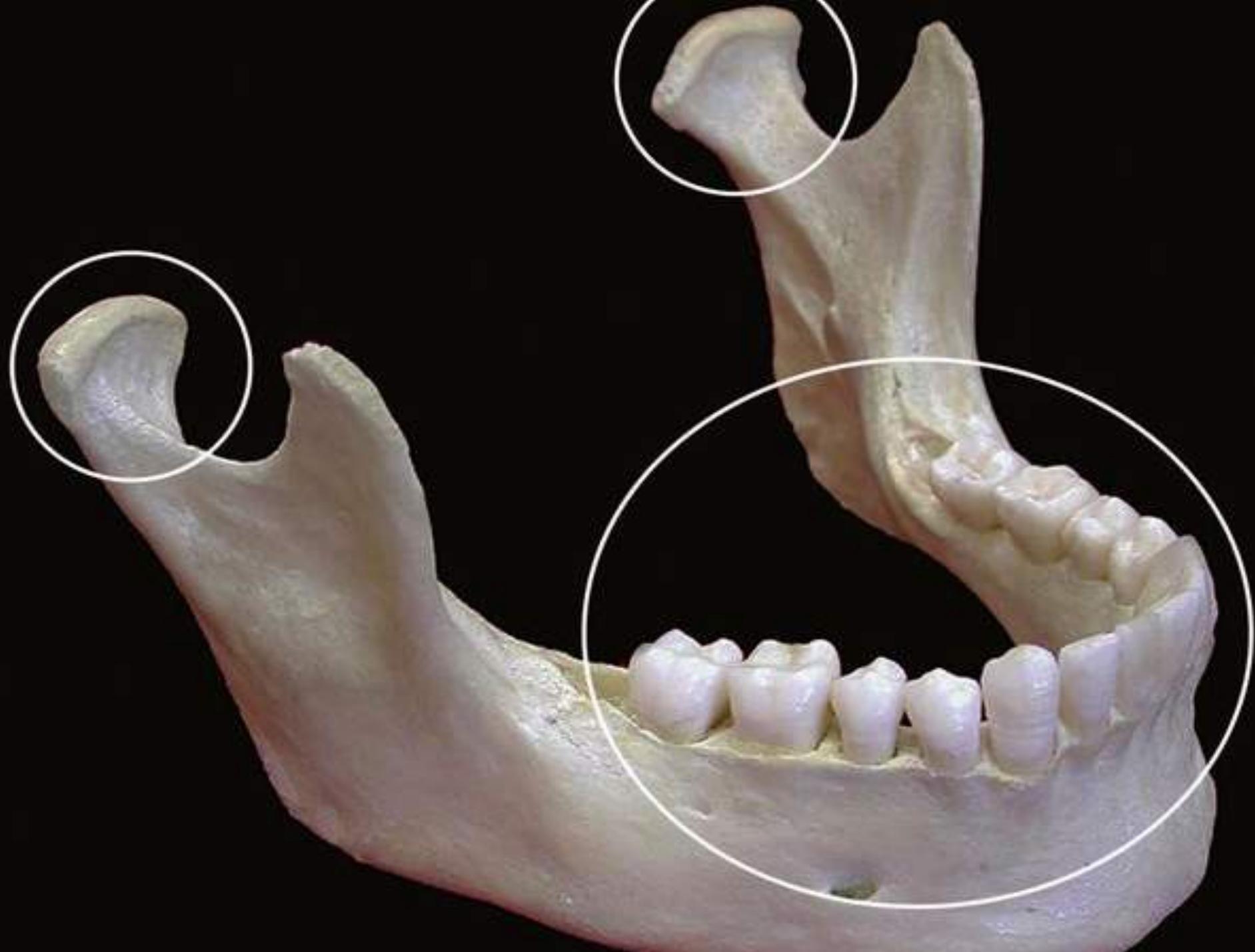
- ▶ (Okeson 120)

# Terminology

- ▶ Orthopedic Stability
- ▶ Biologic Burden
- ▶ Bilateral, Simultaneous, and Stable

# Terminology

- Condylar/Mandibular position
- Orthopedic stability
- Harmonious tooth contacts
- Disharmonious tooth contacts
- Biologic Burden
- Parafunctional Habits
- Bilateral, Simultaneous, Stable (BSS)



# Etiologic Factors

- ▶ Occlusal imbalance/disharmony
- ▶ Trauma- (intracapsular disorders vs. muscular disorders)
  - ▶ Macrotrauma-
  - ▶ Microtrauma-
- ▶ Emotional Stress—“The nonspecific response of the body to any demand made upon it.” Hans Selye

# Masticatory System Overload— Structural Breakdown

- ▶ Tooth wear
- ▶ Pulpitis
- ▶ Tooth mobility
- ▶ Muscle pain
- ▶ TMJ pain
- ▶ Ear pain
- ▶ Headache pain

# Tooth Loss, Splaying of Anterior Teeth and Supra-eruption



# Parafunction

## ▶ Diurnal Activity

- ▶ Lip and cheek biting
- ▶ Nail biting
- ▶ Chewing gum
- ▶ Clenching

## ▶ Nocturnal Activity

- ▶ Bruxing
- ▶ Clenching





# Contributing Factors



- ▶ Predisposing factors- Factors that increase the risk of TMD (Okeson 108)
- ▶ Initiating factors- Factors that cause the onset of TMD(Okeson 108)
- ▶ Perpetuating factors- factors that interfere with healing or enhance the progression of TMD(Okeson 108)

### RECOMMENDED SCREENING QUESTIONNAIRE FOR TMD

1. Do you have difficulty or pain, or both, when opening your mouth, as for instance, when yawning?
2. Does your jaw get "stuck," "locked" or "go out"?
3. Do you have difficulty or pain, or both, when chewing, talking or using your jaw?
4. Are you aware of noises in the jaw joints?
5. Do you have pain in or about the ears, temples or cheeks?
6. Does your bite feel uncomfortable or unusual?
7. Do you have frequent headaches?
8. Have you had a recent injury to your head, neck or jaw?
9. Have you previously been treated for a jaw joint problem? If so, when?

NOTE: If any one of the first three questions is answered affirmatively, the clinician should complete a comprehensive history and exam or refer the patient for same. For questions 4-9, if any two are answered affirmatively, a further evaluation is warranted.

### RECOMMENDED SCREENING EXAMINATION PROCEDURE FOR TMD

1. Measure range of motion of mandible on opening (> 40 mm) and lateral excursions (> 8 mm).
2. Palpate for preauricular tenderness.
3. Palpate for TMJ crepitus.
4. Palpate for TMJ clicking.
5. Palpate for tenderness in the masseter and temporalis muscles.
6. Note excessive occlusal wear, excessive tooth mobility, fremitus or migration in the absence of periodontal disease and soft tissue alterations; i.e., buccal mucosal ridging or lateral tongue scalloping.
7. Inspect symmetry and alignment of the face, jaws and dental arches.

NOTE: Any positive finding for procedures 1-3 warrants consideration for a comprehensive history and examination or referral for such. For questions 4-7, if any two findings are positive, suggest the same consideration.

### RECOMMENDED CHECKLIST OF PSYCHOLOGICAL AND BEHAVIORAL FACTORS

1. Clinically significant anxiety or depression.
2. Evidence of drug abuse.
3. Repeated failures with conventional therapies or visits to numerous clinicians for the same problem.
4. Evidence of secondary pain.
5. Major life events; i.e., new job, marriage, divorce, death.
6. Pain duration greater than six months.
7. History of possible stress-related disorders.
8. Inconsistence in response to drugs.
9. Inconsistent, inappropriate or vague reports of pain or both.
10. Overdramatization of symptoms (symptom magnifier).
11. Symptoms that vary with life events.

NOTE: The first four factors are the most significant. Any one positive factor warrants further evaluation. For factors 5-11, two or more positive findings suggest the need for referral.

# CURRENT DEFINITION OF CENTRIC RELATION

## ▶ CENTRIC RELATION

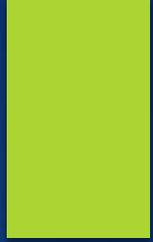
- ▶ A condylar position that is in the most anterior and superior position within the glenoid fossa and with the articular disc properly interposed against the articular eminence.
- ▶ There is no tooth contact in the centric relation position.



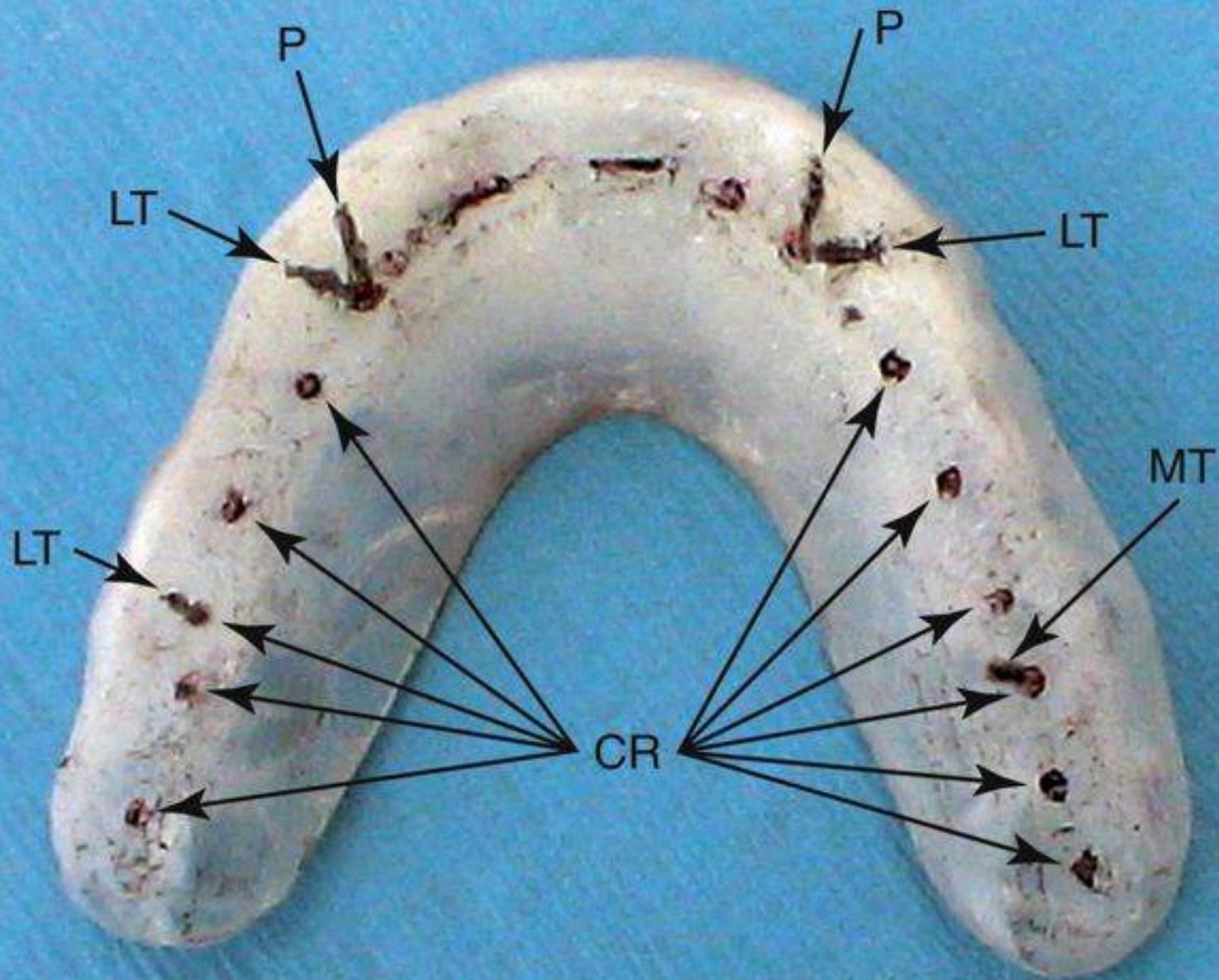


# Design and function of Splints

- ▶ Stable and Passive: Orthopedically stable and Occlusally stable
- ▶ Minimally invasive
- ▶ Incorporate functionally ideal occlusal principles
  - ▶ Bilateral, simultaneous, stable CO tooth contacts at CR hinge axis. (BSS)
  - ▶ Canine guidance and incisal guidance
    - ▶ No interfering tooth contacts in eccentric jaw positions
- ▶ Maintain symptom improvement over time
  - ▶ 3 months of update visits every two weeks
  - ▶ Symptom improvement levels over 50% since initiation of splint therapy













When pain is present, healing is  
compromised.

NSAIDS and OTCs  
MUSCLE RELAXANTS  
ANTI-ANXIETY AGENTS  
OPIOIDS

With all medication use, mindful counseling is  
required!!

# Occlusion/TMD/Masticatory system



” The clinician who only looks at occlusion is missing as much as the clinician who never looks at occlusion.”

Okeson

# Sleep



- ▶ It is very important that the clinician treating TMDs have an appreciation of the relationship between sleep and muscle pain.
- ▶ (Okeson 111)

# Sleep stages and Bruxing events

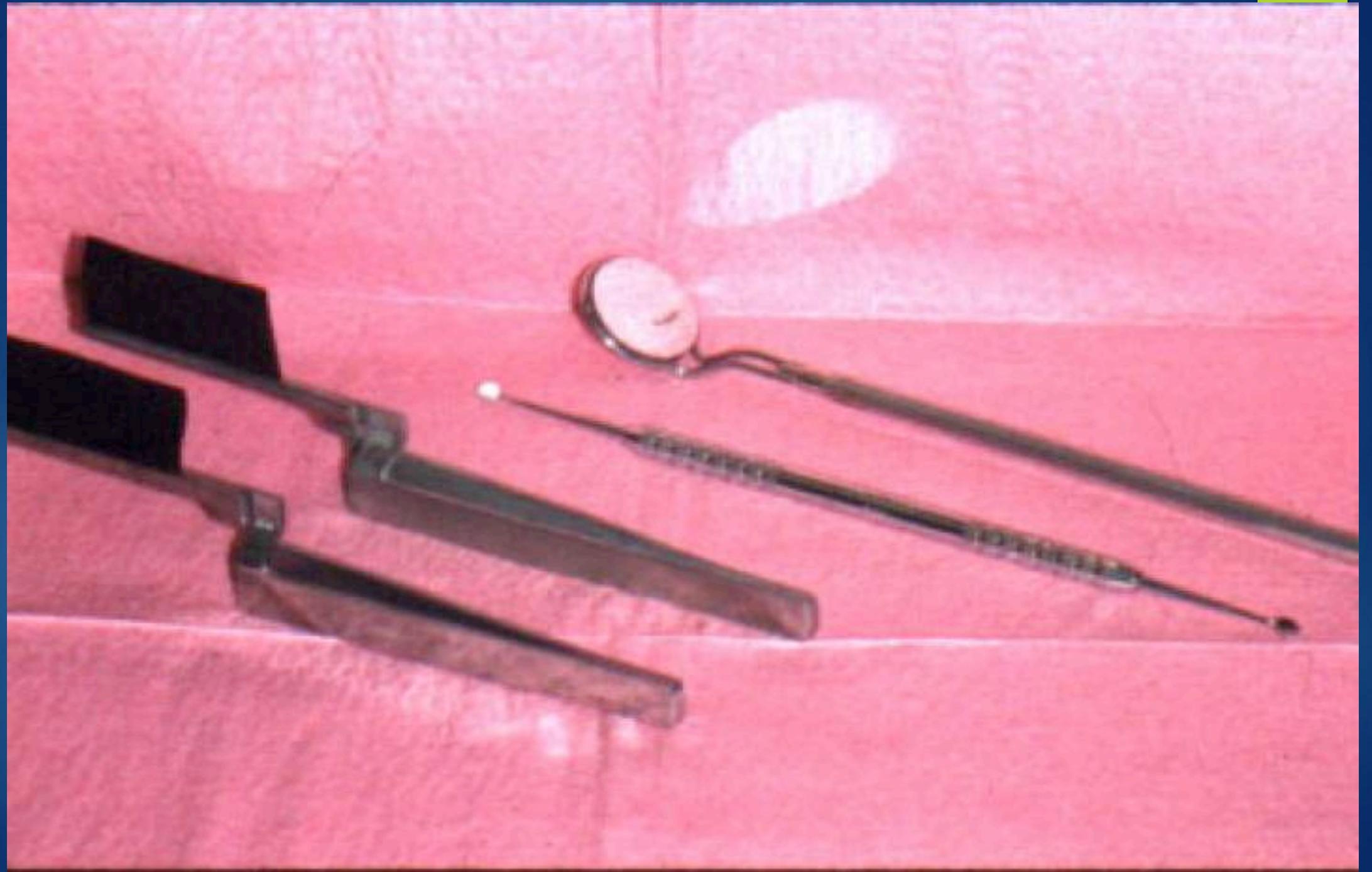
- ▶ Studies have indicated that bruxing may be closely associated with the arousal phases of sleep.
- ▶ Frequency and duration of bruxing events
  - ▶ Wide variation between individuals
  - ▶ Studies show average of 5 to 6 seconds per event.
  - ▶ Voluntary clenching of 20-60 seconds elicits pain in jaw muscles.
- ▶ Intensity of bruxing events
  - ▶ Nocturnal bruxing can reach 60% of a voluntary maximum clench
- ▶ One factor that seems to influence bruxing activity is **emotional stress.**
- ▶ (Okeson 113)

# SNORING AND SLEEP APNEA

	ROOM AIR (06:53:00)	TAP III (07:01:00)	CPAP @ 10cm (06:12:36)
HIGHEST SPO2	97%	98%	98%
LOWEST SPO2	72%	77%	88%
MEAN SPO2	89.4%	90.6%	93.1%
DESATURATION EVENTS<3min	104	51	13
DESATURATION EVENTS>3MIN	16	11	7
TIME SPO2 <90	3:01:24	0:58:16	0:01:24
TIME SPO2 <88	1:01:36	0:23:48	0:00:00
DESATURATION EVENT INDEX	15.1 events/hr	7.3 events/hr	2.1 events/hr











A



B

