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The choice to empower your health

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The choice to empower your health

Abstract

Dental clinicians are at high risk for musculoskeletal disorders (MSDs). Up to 96% of dental hygienists report pain due to clinical work habits, including repetitive movements, bending, twisting, reaching, incorrect operator and patient positioning, and a static posture. Ergonomics is the science of fitting the working environment to the practitioner, instead of forcing one's body to acclimate to the environment. Practicing proper ergonomics can increase productivity, decrease pain, and lengthen one's career. At the conclusion of this course, participants will learn ergonomic techniques, exercises, proper patient positioning, and equipment choices to allow them to practice pain free.

Educational objectives

1. Identify unique MSDs that affect dental professionals
2. Assess ergonomic equipment to maintain proper positioning
3. Review patient and operator positioning to improve ergonomics and reduce pain

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The prevalence of musculoskeletal pain and MSDs in dental practitioners is well documented in the literature, ranging from 64% to 96%.[1-3] According to the research, high pain rates are due to repetitive movements, bending, twisting, reaching, incorrect operator and patient positioning, and a static posture.[1-4] Infrequent breaks and insufficient time for rest are additional contributing factors in the development of MSDs.[5] The dental clinician must realize pain is a protective mechanism of the body. Therefore, any discomfort or pain should be recognized as a warning sign for a potential underlying MSD.

Clinical dentistry is a challenging profession and one that places incredible strain on the musculoskeletal system. As the research indicates, dental practitioners are at high risk for developing various MSDs. In fact, MSDs are the leading cause of disability in the United States.[6] Due to numerous risk factors when practicing dentistry, dental clinicians are at high risk for disability. In one study, dental hygienists who were age 36 and older had a higher incidence of a specific medical diagnosis for their pain, absence from work, or reduced weekly working hours.[7] With this knowledge, it is crucial for dental clinicians to understand ergonomic principles to help them enjoy a long and healthy career.

Although there are always differences from one individual to another, the progression of an MSD typically follows the same pattern. The clinician may occasionally experience symptoms when doing work activities but then notice symptoms during other activities or even at rest. Initially, the symptoms disappear once work activities end but will then progress to constant symptoms, which may wake up the clinician at night. Once the damage has gotten severe enough, the clinician may begin to experience other symptoms such as pain in new areas, depression, and reduced quality of life. The development of an MSD is multifactorial, with genetics, environment, previous injuries, and age all contributing factors. While practitioners have little control over these factors, they do have control over their ergonomics while practicing dentistry.

Ergonomics is the science of fitting the work environment to the worker.[8] It is about recognizing the unique capabilities and limitations of the human body and designing the work environment to support it. However, most dental professionals are provided a workspace, including a fixed operatory design, and they adjust themselves to fit this environment. Unfortunately, this behavior leads to holding awkward postures for an extended period of time, pushing the musculoskeletal system far beyond its intended design, and ultimately ends in not only pain for the clinician, but potentially permanent injury, surgery, disability, and early retirement.

Although practicing dentistry is challenging with a high risk for injury, the dental practitioner can employ several interventions to practice safer and more satisfactorily. Developing an ergonomic mindset, understanding ergonomically correct operator and patient positioning, stretching, and deciding on supportive equipment choices will ensure prolonged health of the body and allow practitioners to practice clinically for as long as they desire.

Defining MSDs

To prevent the onset of an MSD, the dental professional needs to understand what an MSD is and how it develops. MSDs are injuries or disorders of the muscles, nerves, tendons, joints, cartilage, and spinal disks. Some other names for MSDs include cumulative trauma disorders, work-related musculoskeletal disorders, repetitive strain disorder, and overuse syndrome. Work-related musculoskeletal disorders (WMSDs) are conditions in which the work environment and performance of work contribute significantly to the condition, and/or the condition is made worse or persists longer due to work conditions.[8]

MSDs typically worsen over time. The practitioner will first notice discomfort. Then, if left untreated, they will experience loss of motion, nerve compression, and eventual degeneration and loss of function. MSDs are not acute onset injuries; they develop gradually as the cumulative trauma to the musculoskeletal system begins to cause damage and symptoms. MSDs happen when gradual wear and tear (microtrauma) and soft issue fatigue begin to outpace the body's ability to repair it. Eventually, this damage causes inflammation, pain, dysfunction, and potential disability. One in five dental hygienists who permanently leaves the profession is affected by a disability.[9] One study demonstrated that clinicians who practice full time experience more MSDs than those who do not.[7] Rarely in a dental office are there reports of sudden, acute injuries. More often, injury occurs after years of performing repetitive motions while holding static, awkward postures. For example, the mere holding of a mirror in the clinician's nondominant hand can cause pain and dysfunction over time.

The human body is designed for movement and dynamic motion. However, the dental clinician is likely holding static, awkward postures and performing repetitive motions all day long. When the dental worker maintains these unhealthy positions, it takes more muscle activity to hold these positions and resist gravity than if the clinician were performing some variation of dynamic motion. Combine this fact with the inability to take breaks and rest, and one can see how the rate of microtrauma quickly begins to outpace the body's ability to repair.

Examples of common MSDs in dental practitioners are carpal tunnel syndrome, medial epicondylitis, and hand overuse syndrome.[10,15] Hygienists also experience pain in the neck/shoulder region and the back/hip region.[1,2] Another study found that dental hygienists most often seek medical treatment for MSD pain in the wrist and hip regions.[11] Many factors can increase one's risk for developing an MSD, including genetics, environment, previous injuries, and age.[9] While the practitioner has little control over these factors, they do have control over other risk factors such as their body position, the patient's position, and to some extent, operatory layout and equipment choices.

Ergonomics

Ergonomics—fitting a job to a person—helps decrease muscle fatigue, increases productivity, and reduces the number and severity of work-related MSDs.[8] The

goal of ergonomics is to prevent soft tissue injuries and MSDs caused by sudden or sustained exposure to force, vibration, repetitive motion, and awkward posture.[12] The work environment comprises everything in the operatory besides the clinician: the patient, the patient chair, instrument layout and placement, the clinician's stool, the computer setup, and more. In dentistry, ergonomics is arranging the operatory and equipment to fit the practitioner, respecting the human body's unique capabilities and limitations.

Operator positioning

In dentistry, typically, the practitioner is provided a set operatory design and equipment to which they must then adjust. Oftentimes this leads to the practitioner assuming awkward postures and positions, bending, twisting, reaching, and performing repetitive motions for which the body is not designed. As one can see, this is the opposite of ergonomics. The dental clinician must understand neutral posture, establish operator positioning first, and then adjust the operatory elements to support them.

The clinician should aim to maintain neutral posture as much as possible throughout the day. In neutral spinal posture, the curves of the spine are all present and balanced, and the spine is supported mostly by the bony structures of the vertebrae resting on top of one another, resulting in minimal strain on muscles and surrounding tissue.[9] Neutral posture is the position of the neck, shoulders, elbows, hips, and knees in which the flexor and extensor muscles of the body are balanced. This position is typically the midposition of the joints: neck upright, shoulders relaxed, upper arms at sides, elbows flexed to 90 degrees, wrists straight, and fingers relaxed. Postural effects can be easily seen from the profile view. There are several things to consider when establishing neutral posture. To maintain neutral spinal alignment, the ear must be in line with the shoulder, which is then in line with the hip, which is then in line with the foot (if standing). Thus, one could draw a straight line through the ear, shoulder, hip, and foot **(figure 1)**.

In addition, the arms are close to the sides, with the elbows bent at 90 degrees. The practitioner should aim to have the neck flexed no more than 20 degrees, and the arms abducted no more than 20 degrees. Establishing and maintaining neutral posture ensures proper spinal alignment with the most minor strain on the musculoskeletal system.

The dental clinician must establish a neutral position before adjusting the patient and patient chair. Remember, this is the essence of practicing ergonomically: respecting the clinician's own body first, and then adjusting the operatory elements, including the patient, to support that.

Ideally, the clinician will have a fully adjustable operator stool of which the lumbar support, seat pan, and chair height are all adjustable and can be fitted to the individual. The clinician should sit on the stool, bring the lumbar support forward to fit into the low back curve, and adjust the support's height if necessary. The clinician should then adjust the seat pan forward about 10–15 degrees to encourage the thighs to slope downward, and then adjust the height of the stool so that the hips are higher than the knees. Ideally, the hip angle should be at 105–125 degrees, not 90 degrees as many practitioners have been taught. Opening this hip angle decreases muscle activity in the lower back and reduces pressure on the spinal disks. Sitting with the thighs parallel to the floor, combined with the need to lean forward, causes the pelvis to roll back and the lower lumbar curve to flatten.[9] Another aspect to consider is the idea of movement. Since the body is meant to move, there is no ideal seated posture if the practitioner is forced to sit for extended periods. For some practitioners, it may be prudent to alternate sitting and standing or changing stools throughout the day to keep the spine in motion.

After adjusting the stool, the clinician should then establish neutral posture **(figure 2)**. This includes pressing the chin back to align the ear with the shoulder, rolling the shoulders back and down, tilting the head forward if necessary but no more than 20 degrees, and bending the elbows at 90 degrees while keeping the arms close to their sides. The clinician should always try to keep the area they are treating perpendicular to their line of sight as they move around the patient, whether using direct or indirect vision.

Studies have suggested the ideal place for the dental practitioner to provide care is from the 11 o'clock to 1 o'clock positions.[7,9] Clinicians must take care to avoid the 7 o'clock to 9 o'clock and 3 o'clock to 5 o'clock positions, as these force the individual to twist from the lower back, abduct the arm, flex the wrist, and lean

FIGURE 1. Standing neutral posture

FIGURE 2. Sitting neutral posture

toward the patient to perform their duties **(figure 3)**.

If the clinician cannot stay in the 11 o'clock to 1 o'clock position, they can adopt the 9 o'clock or 3 o'clock position for a small amount of time, as long as their body and line of sight are perpendicular to the area being treated. The clinician must also utilize verbal cues to direct their patient while in this position to help maintain both neutrality and adequate visualization **(figure 4)**.

Patient positioning

After operator positioning is established, the clinician may then move their attention to adjusting both the patient chair and the patient. The patient should be positioned based on which arch is to be treated, orienting either the maxillary or mandibular occlusal planes for ideal visibility and supporting the dental practitioner's neutral posture. The practitioner must take the patient's physical and psychological capabilities into consideration as well. It is not uncommon for clinicians to keep the patient in the same position for all areas of the mouth; however, it is ideal to position the patient to encourage proper posture and ergonomics.

FIGURE 3. Dangerous 7 o'clock position

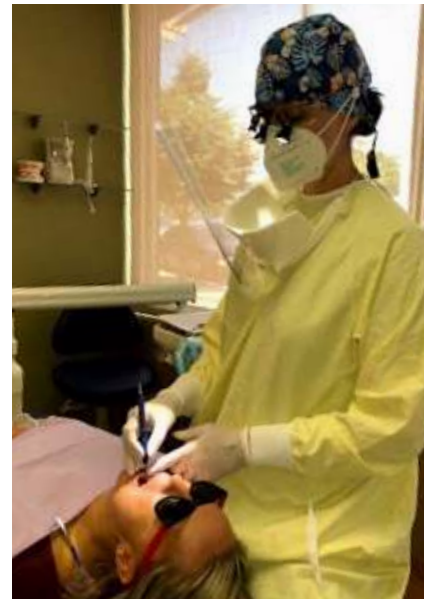

FIGURE 4. Correct 9 o'clock position

FIGURE 5. Correct patient head position

Before leaning the patient back, the clinician should instruct the patient to move their bottom as far back on the seat as possible. When the clinician has the patient leaned back, they should have the patient "scoot" back in the chair so that the top of the patient's shoulders are in line with the top of the patient chair back. This will allow the head to be fully positioned on the headrest to allow for proper adjustment depending on the arch being treated **(figure 5)**.

For the mandibular arch, the patient chair should be placed in a semi-supine position with the chair back between 20 to 30 degrees elevated from the horizontal plane. The clinician should incline the patient headrest (or use cushions if using a nonarticulating headrest) to encourage the patient's chin to nod toward the chest, placing the occlusal plane in the ideal position of 30 degrees elevated from the horizontal plane **(figure 6)**.

The clinician may also use verbal cues to direct the patient to lower their chin further. Placing the occlusal plane in the proper position is crucial for operator visibility and ease of treatment and allows the operator to maintain neutral posture. Once the occlusal plane has been correctly oriented, the clinician should lower the chair to allow for the neutral position of their forearms. This may be difficult for operators under 5'6" as the patient chair may not lower far enough to establish neutrality of the forearms, resulting in excessive contraction of the upper trapezius muscle. In this case, it is recommended that the operator use a stool that will allow a higher seated position, such as a saddle stool, adopting a standing position, or reclining the patient into a fully supine position and using cushions and/or verbal cues to orient the occlusal plane properly.

FIGURE 6. Correct patient position for mandibular arch

The position for the maxillary arch is very different than that of the mandibular arch. The patient's chair back should be placed as close to parallel as possible to the horizontal plane. The clinician should decline the headrest steeply to allow the patient's chin to rise, placing the maxillary occlusal plane between 10 to 20 degrees behind the vertical plane **(figure 7)**. This placement is crucial to avoid the operator leaning forward from either the waist or head to visualize and treat the maxillary arch. The clinician may also use verbal cues to direct the patient to raise the chin further. Once the occlusal plane has been correctly oriented, the clinician should adjust the patient chair or operator stool to allow neutral positioning of the forearms.

FIGURE 7. Correct patient position for maxillary arch

Stretching

Isometric muscle contraction is characterized by sustained contraction of muscles with no change in the length of the involved muscle groups and no change in joint angle.[13] This is frequently seen in clinically practicing dental workers when performing job-related tasks. When a muscle contracts for a period of time, the intramuscular pressure rises, thereby reducing blood flow.[9] The lack of blood flow that provides key nutrients and oxygen results in inflammation, pain, and fatigue. The upper trapezius muscle is the most overused muscle in dental practitioners, with consequences of this overuse ranging from muscle ischemia, myalgia, headaches, neck and jaw pain, and loss of motion.[14]

Stretching is fundamental for the health of the human body, regardless of profession. However, for someone practicing dentistry, stretching is paramount to the optimal health of the musculoskeletal system and is key to having a long and pain-free career and life. Due to the static, awkward postures operators face and the isometric contractions of the muscles when performing clinical duties, stretching is crucial to restoring the health and function of the muscles while reducing pain, inflammation, and fatigue.

It has been shown that taking a microbreak every 20 minutes reduces the pain and fatigue experienced by dental practitioners.[5] Due to demanding schedules and clinical tasks needing to be completed, dental clinicians may not feel they have time to stretch during their patient appointments. However, planning stretches that last about 30 seconds every 20 minutes or so during key transition times during the appointment is possible **(figure 8)**. For example, a dental hygienist could plan a trapezius stretch between scaling and polishing or a wrist flexor stretch between scaling the lower and upper arches. After the hygienist feels the relief by implementing these stretches, they will likely see the benefit of planning microbreaks.

FIGURE 8. Chairside trapezius stretch

Equipment choices

It seems more products are being branded or marketed as "ergonomic." It can be challenging for the dental worker to know if any given product is truly ergonomic. However, if the individual knows the fundamental principles of ergonomics and neutral posture, they will better assess products to ensure ergonomic support.

Loupes and a headlamp are becoming the standard for practicing dentistry and have provided increased magnification and clarity for many practitioners. However, not all loupes are genuinely ergonomic, and if the clinician uses nonergonomic loupes or ones that have not been properly fitted, they can make pain and risk for an MSD even higher. Therefore, the practitioner must be fitted by a knowledgeable company representative who can get them into neutral posture and then perform their measurements.

Stools are an important consideration for the dental clinician. Although it is optimal for clinicians to alternate sitting and standing while providing care, it is still common for them to sit for most of their day. Therefore, it is vital to have a properly selected and adjusted stool. There are many different sizes, types, and heights of clinical stools available. A stool that fits one practitioner may not be the right fit for another. It is recommended that the individual seek out a manufacturer representative to be properly evaluated and have the most appropriate stool selected.

There are various ergonomic products available to the dental practitioner that can support neutral posture and increase ergonomics. However, the clinician must make equipment choices with neutral posture in mind to make discerning choices when evaluating equipment.

Conclusion

Despite the risks posed by practicing dentistry, there are many ways dental clinicians can be empowered to take charge of their health. Shifting their mindset and thinking of ways they can care for themselves before even walking into the operatory will help prioritize their health, not compromise it, so they can perform their clinical duties. Dentistry is a caring profession and clinicians are concerned for the comfort and optimal treatment of their patients. While admirable, this cannot come before the health and longevity of clinicians bodies.

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Notes

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QUESTIONS

1. Work-related pain among dental hygienists has been reported as high as:
   - A. 25%
   - B. 50%
   - C. 5%
   - D. 96%

2. High pain rates are due to:
   - A. Bending
   - B. Twisting
   - C. Repetitive movements
   - D. All of the above

3. Additional risk factors for ergonomic injury are:
   - A. Incorrect positioning
   - B. Decreased time for rest
   - C. Static posture
   - D. All of the above

4. Musculoskeletal disorders typically progress:
   - A. Suddenly
   - B. Gradually
   - C. Differently for everyone
   - D. None of the above

5. Ergonomics is:
   - A. The science of fitting the workplace to the worker
   - B. Respecting the unique capabilities and limitations of the human body
   - C. Crucial to having a long and healthy career
   - D. All of the above

6. MSDs can affect:
   - A. Muscles
   - B. Nerves
   - C. Tendons
   - D. All of the above

7. Symptoms of an MSD include:
   - A. Discomfort, pain
   - B. Loss of motion, nerve compression
   - C. Degeneration, loss of function
   - D. All of the above

8. MSDs typically progress:
   - A. For no reason
   - B. Due to gradual wear and tear outpacing the body's ability to repair it
   - C. Due to poor diet
   - D. Due to excessive exercise

9. How many hygienists who leave the field are affected by a disability?
   - A. 1 in 100
   - B. 1 in 50
   - C. 1 in 25
   - D. 1 in 5

10. Which is a common MSD in dental clinicians?
    - A. Carpal tunnel syndrome
    - B. Medial epicondylitis
    - C. Hand overuse syndrome
    - D. All of the above

11. The goal of ergonomics is to:
    - A. Prevent soft tissue injuries and MSDs
    - B. Learn proper posture
    - C. Get new equipment
    - D. Treat pain

12. Neutral posture is:
    - A. Posture that supports the natural curvature of the spine
    - B. Characterized by the ear being in front of the shoulder
    - C. Only important when seeing patients
    - D. Not possible in dentistry

13. When viewing neutral posture from the side:
    - A. There should be a straight line from the ear, shoulder, hip, and foot
    - B. The head is in front of the shoulder
    - C. The head is behind the shoulder
    - D. It's different for everyone

14. Loupes and clinician stools:
    - A. Need to support the clinician in neutral posture
    - B. Need to be fitted to the clinician
    - C. Don't matter
    - D. Both A and B

15. Neutral posture includes:
    - A. Ear in line with shoulder
    - B. Arms close to sides
    - C. Elbows bent at 90 degrees
    - D. All of the above

16. Operator positioning should be established:
    - A. After adjusting the patient
    - B. At no particular time
    - C. At the very start of the appointment
    - D. After getting instruments set up

17. When seated, the operator should aim for:
    - A. All body weight resting on the stool
    - B. Hips above the knees
    - C. Thighs parallel to the floor
    - D. No tilt in the seat pan

18. The ideal clock position for clinicians is:
    - A. 7 o'clock
    - B. 5 o'clock
    - C. 11 o'clock–1 o'clock
    - D. There is no ideal position

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QUESTIONS

19. When seated at 9 o'clock or 3 o'clock, the clinician must:
    A. Ensure they are facing the patient directly from the side
    B. Sit sideways and lean in toward the patient
    C. Try to limit these clock positions
    D. Both A and C

20. When positioning the patient, clinicians must:
    A. Ensure the patient doesn't move for the whole appointment
    B. Adjust the position depending on the arch being treated
    C. Ensure the patient position supports the clinician in neutral posture
    D. Both B and C

21. When the patient is reclined:
    A. Ask them to scoot all the way up so their head is on the headrest completely
    B. Don't ask them to move
    C. Leave them in the same position for the entire appointment
    D. Only partially recline for patient comfort

22. To treat the mandibular arch:
    A. The patient chair back should be 20–30 degrees elevated from the horizontal plane
    B. The occlusal plane should be 30 degrees elevated from the horizontal plane
    C. The headrest should be angled forward to encourage the patient's chin to nod toward their chest
    D. All of the above

23. To treat the maxillary arch:
    A. The patient chair back should be parallel to the horizontal plane
    B. The occlusal plane should be 10–20 degrees behind the vertical plane
    C. The headrest should be angled down to encourage the patient's chin to nod toward the ceiling
    D. All of the above

24. Isometric muscle contraction:
    A. Is frequently seen in dental clinicians when performing work duties
    B. Is not a concern
    C. Prevents blood from supplying that muscle
    D. Both A and C

25. The lack of blood flow causes:
    A. No effect
    B. Pain, fatigue, and inflammation
    C. Eventual damage to the tissue
    D. Both B and C

26. Stretching for the dental clinician:
    A. Is crucial for restoring health and function to the muscles
    B. Is optional
    C. Should be done throughout the day
    D. Both A and C

27. Microbreaks:
    A. Reduce pain and fatigue in dental practitioners
    B. Consist of 20- to 30-second stretch breaks every 20 minutes
    C. Can be incorporated into key transition periods during the appointment
    D. All of the above

28. Ergonomic loupes:
    A. Are custom fitted to the practitioner when in neutral posture
    B. Are not important
    C. Increase neck/back pain
    D. All of the above

29. When selecting a stool, the practitioner must consider:
    A. They are not one-size-fits-all
    B. Being fitted by a knowledgeable company representative
    C. If it will support them in neutral posture
    D. All of the above

30. Practicing proper ergonomics can:
    A. Increase the duration and quality of the practitioner's career
    B. Reduce pain and fatigue
    C. Easily be incorporated into clinical practice
    D. All of the above

PUBLICATION DATE:	MAY 2022
EXPIRATION DATE:	APRIL 2025

ANSWER SHEET

The choice to empower your health

NAME: TITLE: SPECIALTY:

ADDRESS: EMAIL: AGD MEMBER ID (IF APPLIES):

CITY: STATE: ZIP: COUNTRY:

TELEPHONE (PRIMARY): TELEPHONE (OFFICE):

REQUIREMENTS FOR OBTAINING CE CREDITS BY MAIL/FAX: 1) Read entire course. 2) Complete info above. 3) Complete test by marking one answer per question. 4) Complete course evaluation. 5) Complete credit card info or write check payable to Endeavor Business Media. 6) Mail/fax this page to DACE. If you have any questions, please contact dace@endeavorb2b.com or call (800) 633-1681. A score of 70% or higher is required for CE credit.

COURSE CAN ALSO BE COMPLETED ONLINE AT A LOWER COST. Scan the QR code or go to dentalacademyofce.com to take advantage of the lower rate.

Educational Objectives

1. Identify unique musculoskeletal disorders that affect dental professionals
2. Assess ergonomic equipment to maintain proper positioning
3. Review patient and operator positioning to improve ergonomics and reduce pain

Course Evaluation

1. Were the individual course objectives met?

   Objective #1: Yes No Objective #2: Yes No Objective #3: Yes No

Please evaluate this course by responding to the following statements, using a scale of Excellent = 5 to Poor = 0.

2. To what extent were the course objectives accomplished overall?	5	4	3	2	1	0
3. Please rate your personal mastery of the course objectives.	5	4	3	2	1	0
4. How would you rate the objectives and educational methods?	5	4	3	2	1	0
5. How do you rate the author's grasp of the topic?	5	4	3	2	1	0
6. Please rate the author's effectiveness.	5	4	3	2	1	0
7. Was the overall administration of the course effective?	5	4	3	2	1	0
8. Please rate the usefulness and clinical applicability of this course.	5	4	3	2	1	0
9. Please rate the usefulness of the references.	5	4	3	2	1	0
10. Do you feel that the references were adequate?	Yes		No			
11. Would you take a similar course on a different topic?	Yes		No			

12. If any of the continuing education questions were unclear or ambiguous, please list them.

    _____

13. Was there any subject matter you found confusing? Please describe.

    _____

14. How long did it take you to complete this course?

    _____

15. What additional dental continuing education topics would you like to see?

    _____

    _____

    _____

Mail/fax completed answer sheet to:
Endeavor Business Media
Attn: Dental Division
7666 E. 61st St. Suite 230, Tulsa, OK 74133
Fax: (918) 831-9804

☐ Payment of $69 is enclosed (this course can be completed online for $39. Scan the QR code or go to dentalacademyofce.com to take advantage of the lower rate).

Make check payable to Endeavor Business Media

If paying by credit card, please complete the following:

☐ MC ☐ Visa ☐ AmEx ☐ Discover

Acct. number: _____

Exp. date: _____ CVC #: _____

Billing address: _____

_____

Charges on your statement will show up as Endeavor.

1.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	16.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
2.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	17.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
3.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	18.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
4.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	19.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
5.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	20.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
6.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	21.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
7.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	22.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
8.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	23.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
9.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	24.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
10.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	25.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
11.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	26.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
12.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	27.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
13.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	28.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
14.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	29.	Ⓐ	Ⓑ	Ⓒ	Ⓓ
15.	Ⓐ	Ⓑ	Ⓒ	Ⓓ	30.	Ⓐ	Ⓑ	Ⓒ	Ⓓ

EXAM INSTRUCTIONS
All questions have only one answer. If mailed or faxed, grading of this examination is done manually. Participants will receive confirmation of passing by receipt of a Verification of Participation form. The form will be mailed within two weeks after receipt of an examination.

COURSE EVALUATION AND FEEDBACK
We encourage participant feedback. Complete the evaluation above and e-mail additional feedback to Aileen Southerland (asoutherland@endeavorb2b.com) and Laura Winfield (lwinfield@endeavorb2b.com).

COURSE CREDITS AND COST
All participants scoring 70% or higher on the examination will receive a verification form for three (3) continuing education (CE) credits. Participants are urged to contact their state dental boards for CE requirements. The cost for courses ranges from $20 to $110.

PROVIDER INFORMATION
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Dental Board of California: Provider RP5933. Course registration number CA code: 03-5933-22050. Expires 7/31/2022. "This course meets the Dental Board of California's requirements for three (3) units of continuing education."

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Endeavor Business Media maintains records of your successful completion of any exam for a minimum of six years. Please contact our offices for a copy of your CE credits report. This report, which will list all credits earned to date, will be generated and mailed to you within five business days of receipt.

CANCELLATION AND REFUND POLICY
Participants who are not 100% satisfied can request a refund by contacting Endeavor Business Media in writing.

IMAGE AUTHENTICITY
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