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The impact of musculoskeletal disorders on the dental hygienist

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Abstract

Dental hygiene is a profession that requires countless intricate skills. Studies show that a high percentage of clinicians have musculoskeletal pain even before entering the workforce. Pain involving the back, neck, shoulders, hand, and wrist are among the most common musculoskeletal injuries in clinical dental professionals. Chiropractic care, therapeutic massage, stress relief strategies, exercise, weight control, breath control, and proper ergonomic equipment are among the top recommended treatment protocols for prevention and/or recovery and reversal of musculoskeletal disorders.

Educational objectives

Upon completion of this course, the dental hygienist should be able to:

1. Assess the need for ergonomic training through dental programs and continuing education courses
2. Identify the most effective preventive techniques to prevent work-related injuries in dentistry
3. Recognize musculoskeletal disorders commonly affecting practicing hygienists
4. Discuss recovery and/or reverse effects of dental-related musculoskeletal injuries

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This course meets the Dental Board of California's requirements for three (3) units of continuing education.



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Background and prevalence

Musculoskeletal disorders (MSDs) are prevalent health risks for the dental professional and one of the most important occupational health issues for health-care workers.¹ They are identified as injuries to the human support system of muscles, ligaments, tendons, nerves, blood vessels, bones, and joints and can occur from a single event or prolonged trauma.^{2,3} MSDs are associated with repetitive strain or cumulative trauma to the tissues, and are noted in 64%–93% of dental professionals.² Statistics show that many imbalances begin before dental professionals graduate, and many highly educated and skilled dental professionals' careers are prematurely ended due to these painful work-related injuries.⁴ By the time many dental professionals develop their skills to the level of excellence, the static positions required for the delivery of their expertise have created significant imbalances in muscles and unnatural skeletal changes in the cervical, thoracic, and lumbar spine; therefore, many providers cannot continue to practice at the peak of their proficiencies and knowledge. In addition, psychosocial activities can accelerate these bodily changes.

Unfortunately, most individuals do not think about body posture and healthy preventive musculoskeletal practices until an injury or pain occurs. Once painful symptoms manifest, the individual typically has many cumulative injuries in both the skeletal and muscular systems; consequently, correctly diagnosing the root sources of the problems is rather difficult.

This review compiles only a few of the possible preventive and treatment measures, such as routine chiropractic adjustments and massage, diaphragmatic breathing, vibration and electrical therapy, and kinesiology taping. These measures often share the same initial approach for both preventive care and treatment but are utilized in different protocols for the individual's distinctive physical and mental needs.

Occupational risk factors

Along with the immense amount of knowledge to intake and mental exhaustion during dental hygiene training, there is also a

physical burden of clinical training that is rarely reviewed, and the educational setting is often where MSDs begin.² Dental-related careers are proven throughout the literature to be high risk for MSDs. Although the most common injuries are sustained in the neck and spine, many practitioners experience injuries in their extremities, such as wrists, fingers, hips, legs, and feet.² The static positions cause widespread muscle knots (also known as trigger points) that are often extremely painful and usually cause referred pain to other areas of the body.⁵ Chiropractic studies show that permanent musculoskeletal damage is already present in the body before acute and chronic pain even presents itself.⁶

The primary goal for the dental hygienist is to prevent oral disease, but hygienists often fail to implement the same standards for their own physical health. Ergonomics is taught to dental hygiene students in the introductory classes in most dental hygiene programs, but ergonomics is a mere mention in most colleges for the remainder of the students' training. Ergonomic education may be unsatisfactory due to the challenge in translating didactic instruction to clinical application or high stress load and poor static postural positioning.⁷ Tension neck syndrome, trigger points, and shallow (accessory) breathing are only a few of the musculoskeletal complications that manifest in the student dental hygienist.

While clinical courses provide students repetition to improve on these skills, applying the information and properly practicing these skills take time. The many risk factors and symptoms have serious implications for career loss, discomfort, disability, and productivity. Symptoms can start as early as the second year of dental hygiene school as students move into clinical work, and if not corrected early on will continually progress.⁸

It is important to educate not only students but also practicing hygienists about the risks they take by not practicing proper ergonomics. Preventive measures have proven to drastically decrease these disorders and prevent work-related injuries, allowing a lifelong dental-related career. When ergonomic

training is continually implemented, it has been shown to decrease musculoskeletal pain, although hobbies and extracurricular activities outside of the profession may also affect musculoskeletal symptoms.⁹ It is negligent and a severe disservice to dental hygiene students and practicing hygienists to ignore the research and facts of these work-related risks and fail to educate and empower individuals with preventive modes.¹⁰ With proper education, implementation of precise strategies, and custom or modified equipment, MSDs and pain can significantly decrease, extending the hygienist's career.

Preventive technique

In the dental profession, complex and fine motor activities in small spaces can be difficult to achieve. Hygienists create improper modifications such as bending or overtwisting their torsos for better visualization. Any position that is held repetitively over an extended amount of time will result in the body adapting permanently to those positions. Healthy neutral posture in everyday life and in the workforce is the number one preventive measure.

In a dental operatory, neutral positions must be the focus return posture if one is to prevent MSDs. Unfortunately, most individuals don't even think about body posture and healthy preventive musculoskeletal practices until an injury or pain occurs. Decreasing work hours, routine chiropractic adjustments and massage, stress management, personal workout routines specifically designed for dental professionals, nonsteroidal anti-inflammatory drugs, and yoga are all effective self-preservation practices.

In addition, if the patient has a difficult-to-access mouth or workplace design is not ideal, the hygienist can be in constant poor positioning. Dental professionals should seek medical consultation after initial signs of MSDs, but they often continue their work in a modified manner due to financial or work pressure. Initial signs of MSDs include localized body stiffness and joint pain, muscle spasms, and delayed muscle recovery from work positions. Work MSDs are avoidable, and if enough attention is paid, symptoms can

be reversed.¹¹ Repetitive movements, such as those created when performing a prophylaxis or scaling and root surface debridement, combined with prolonged static posture, poor positioning, and genetic predispositions allow for muscular pain and dysfunction.¹² Physiotherapy techniques are described below, but treatment can also include pharmacological approaches and neurological consultation.

Operatory and instrument design

Ergonomic fit varies between individuals. Nonergonomic workplace designs and layouts cause overreaching or limit maneuverability. Poor instrument/tool designs can also be problematic.^{11,12} One example of using unnatural posture or awkward reaching is typing notes or probe scores at a computer while simultaneously treating the patient.¹³ Additionally, many equipment designs are more accommodating to males and can be challenging for females, particularly through pregnancy or the aging process.¹⁰ Operator chairs should be custom fitted to the operator. For example, traditional operator chairs may provide back and arm supports, but the saddle chair design allows better access in relation to the patient's head and mouth by allowing the provider to slide under the patient chair.

Preventive measures specifically designed for the dental operatory are simple to understand but may be difficult to implement under demanding dental delivery treatments. Instrument designs should reduce forceful exertion and allow the wrist to remain in a neutral position.¹⁴ When choosing the right instrument, there is no standard for an "ergonomic" instrument. A hexagonal handle with hard edges can cause muscle stress and digital nerve compression; however, a round instrument, which is typically recommended, can cause the operator to pinch the instrument to prevent it rolling in the hand.¹⁴ Hollow instruments with circumferential grooves allow better friction for a more secure grasp, although the grooves can be bothersome to the fingertips.

Ultrasonic scalers should be considered for use with each patient since hand scaling requires significantly more physical force with the hands and wrists.

Ultrasonic scalers should be light weight with a noncoiled, short hose and swivel mechanism to allow minimal hand and wrist movement for the clinician.¹ They provide a broad range of power settings needed for thorough calculus removal versus hand scalers, although the use of vibratory instruments may be a risk factor for MSDs.¹⁵ Further research is needed to ascertain whether the vibrations or repetitive use causes hygienists to be at greater risk for MSDs.¹⁵

Loupes

Patient and operator chairs must be at the correct positions and heights for the dental professional to maintain a neutral sitting position. This includes the feet evenly placed on the floor, hips slightly elevated above the knees, and a gentle S curve in the lumbar and cervical spine. Loupes can help preserve optimal positioning of the spine while positively influencing the shoulder blades.¹⁶ In recent years, the use of loupes has been promoted for ergonomic benefits, but there is no strong evidence to support their use in preventing MSDs.¹⁷ Additionally, a review conducted by Plessas and Bernardes Delgado found that magnification from loupes helped to relieve shoulder and arm pain but not pain associated with the neck.¹⁸

Breath control

Correct breathing is the key to preventing and even reversing significant mental and physical ailments.¹⁹ Repetitive downward motions of the arms, with a slumped, head-forward posture, can cause trigger points in the chest.²⁰ Under stress, individuals may subconsciously hold their breath, subtly hyperventilate, or breathe shallowly with the chest instead of the abdomen. When breathing, ideally, the abdomen should expand outward with each inhalation instead of the chest.²⁰ Having a hunched posture can keep the chest muscles shortened and tight, causing increased discomfort and trigger points. Deep (diaphragmatic) breathing rather than shallow (accessory) breathing can promote improved overall health.

Additionally, mental health is becoming a focal point for whole body health. Our thoughts directly affect everything in

our bodies and every aspect of our lives. A positive state of mind promotes clarity of thought, overall sense of well-being, and enables the muscular system to maintain a natural relaxed state.²¹ Negative mindset and chronic stress impair cognitive abilities, focus, and memory retention.²² Overall internal tension produces countless adverse effects, including hormonal release of high levels of cortisol (which causes inflammation), chronically tense muscles that can contribute significantly to cumulative trauma disorders (CDT) including tension neck syndrome and chronic headaches, and possibly may result in muscle atrophy. Relaxation and stress-relieving practices are proven to reduce tense muscles by starting with the mind.²¹ A few examples include progressive relaxation, breath control, visualization, exercise, meditation, and dynamic and static stretches.

Musculoskeletal injuries

Back pain: Lower back pain is one of the most prevalent MSDs among dental professionals, directly related to too much sitting and bending over.² Studies have found 53%–64% of hygienists have reported suffering from back pain.²³ Working in the 8 o'clock position is most challenging for the lower back compared to other seated positions due to the axial twist of the spine.²⁴ It is recommended that hygienists sit in a neutral seated posture in which there is a slightly downward thigh posture with a slightly anterior pelvic tilt. The thighs should be at an angle between 120 and 135 degrees. It is also important to periodically change positions.²³ When clinicians experience lower back pain, movements such as bending, walking, or changing from sitting to standing can become difficult.

Neck and shoulder pain: Similar to back pain, nearly 64% of dental hygienists report pain in the upper body region.² One of the most common MSDs, upper crossed syndrome, is a postural dysfunctional pattern of the musculature of the shoulder girdle/cervicothoracic region.²⁵ This syndrome is common in individuals who maintain a forward head posture, unnatural twisting and static work position, rounded shoulders, and prolonged

sitting. Characterized by tight suboccipitals, pectorals, upper trapezius, and levator scapulae with the reverse effect on the opposing/cross section of muscles, the back muscles of the shoulder and neck are extremely overstrained, causing those in the front of the chest to become tight and shortened.²⁵ The underlying cause of pain is poor posture or long periods with the head pushed forward. Dental professionals often assume all these unnatural positions; therefore, many practitioners have this syndrome with and without symptoms and/or pain. Chiropractic care, physical therapy, and stretching exercises can help treat the condition.

Hand and wrist pain: The onset of musculoskeletal symptoms frequently begins during dental hygiene training.² One study suggests 69% of hygienists suffer from some type of pain in the hand and arm region.² Carpal tunnel syndrome, caused by compression of the median nerve, is among the most common MSDs affecting hygienists.³ When the wrist is held in an extended position or is flexed, the nerve gets pinched, causing tingling or numbness in the tips of the thumb, index, middle, and ring fingers.¹⁶ Common proactive approaches to prevent carpal tunnel syndrome or other extremity pain include proper ergonomics, engaging in dynamic movements (to avoid static positions), stretching throughout the day, and staying hydrated.

Solutions

Neutral posture positions: Putting the body in a neutral position in both standing and sitting postures in everyday activities and exercise is the first major step to musculoskeletal imbalance reversal and recovery. Correct sitting posture includes feet flat on the floor, hips slightly elevated above the knees, and an upright S curve in the lumbar and cervical spine. Standing neutral posture requires feet evenly placed hip-width apart on the floor, with weight primarily placed on the balls of the feet, knees slightly bent, standing tall with stomach tucked in and head positioned so the ears are in line with the shoulders, with chest lifted and shoulder blades back. Incorrect form in these two functioning areas of daily life will

exacerbate musculoskeletal imbalances and prevent recovery. Once individuals realize the extent of their imbalances and correct their body position, they can begin utilizing more areas of correction to aid in the healing process.

Diaphragmatic breathing: Diaphragmatic breathing is a technique using contraction of the diaphragm muscle to move air down into the body, increasing the diaphragm length and breathing efficiency.¹⁹ Shallow or accessory muscle breathing can be a result of many factors, including poor posture, anxiety, stress, asthma, and smoking.¹⁹ A proper breath is supposed to come from the belly, causing the diaphragm to flatten and spread and the bottom ribs and abdomen to push out. When breathing through the top of the body (accessory breathing), neck and shoulder muscles are used, causing neck and shoulder stiffness.¹⁹ Another breathing disorder that is directly related to MSDs is hyperventilation syndrome (HVS).²⁶ This syndrome is multifaceted and can be difficult to correctly diagnose. Occurring from fear or stress, symptoms can include palpitations, chest pain, chest tightness, and dizziness.²⁶ HVS is the most widely recognized form of dysfunctional breathing, in which chronic changes in breathing pattern lead to dyspnea combined with nonrespiratory symptoms.²⁶

Chiropractic adjustments: Routine chiropractic adjustments are proven to loosen joints that are not moving properly and align the disks of the neck and spine.²⁷ This releases the nerves that travel to all organs and muscles from impingements, thereby decreasing pain and allowing vessels to receive the necessary amount of blood flow required for whole body health. MSDs are multifactorial and are not easily treated due to lifestyle variances and unique damage of the hard and soft tissues. Individuals must be very self-aware in body, mind, actions, and customized health-care providers to take control of their musculoskeletal disorder.

Kinesiology taping: Kinesiology taping is a relatively new, effective technique for stretching muscles to reduce pain, correct alignment, and alleviate inflammation and swelling.^{28,29} For prevention purposes, this taping technique

encourages good blood flow in treatment areas, along with holding the body in neutral, healthy postures.

Tissue therapy: Few people live without ever having experienced muscle pain due to trauma, injury, overuse, or strain.¹⁴ Deep tissue massage and trigger point therapy address the tender areas in weakened and overworked muscles. Many chiropractors include these services in their treatment plans. People are likely to prematurely discontinue trigger point therapy in combination with massage services because the trigger point therapy does not send active referred pain, although it is in a latent stage. Individuals must not discontinue trigger point therapy after they receive initial relief. The trigger points can be quickly reactivated with overuse, injury, or stress, thus requiring further tissue therapy.²⁰ Although these therapeutic massages initially result in more tenderness and even bruising, if fully completed, the result is tissue healing and renewal.

Vibration and electrical therapy: Transcutaneous electrical nerve stimulation (TENS) utilizes electrical currents to focus on specific problematic areas in the body. Pads are placed directly on the skin over painful areas to address pain in a targeted region.³⁰ Although the concept of TENS has been the topic of much debate, its noninvasive method of therapy has proven pain-relieving results in clinical investigation.³⁰ It is a temporary, nonmedicinal analgesic that can decrease nerve pain and prevent pain recurrence in some cases.

Vibration therapy has been widely used professionally for many years, but newer developments in deep tissue vibration therapy have recently emerged in the form of higher voltage, more powerful machines. Personal trainers, chiropractors, physical therapists, and personal home devices are now becoming part of routine tissue therapy. When used in conjunction with exercise and chiropractic care, individuals have been shown to have significantly less muscle soreness.³¹

Conclusion

It is imperative that aspiring dental hygienists be made aware of the high musculoskeletal risk that their career creates,

and they should demand ergonomic training as part of their educational experience. In a field where prevention is the primary goal and focus for the patient, dental hygienists are often negligent in protecting their own bodies by overlooking proper ergonomic education and preventive therapies.

Specifically designed preventive measures are available for dental practitioners, but individuals often wait until they have permanent damage and pain before they decide to invest in their own well-being. Proper ergonomics and instrument design are essential in the prevention of MSDs. Equally as important, the patient and operator chairs as well as the whole workstation should be adaptable to all body sizes to allow clinicians to maintain a neutral working posture. Maintaining a relaxed, but nonstatic, neutral working position is imperative. Incorporating proper breathing techniques, routine chiropractor adjustments, deep tissue and trigger point massage, and kinesiology taping can help dental hygienists maintain longevity in their career.

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QUESTIONS

1. Musculoskeletal disorders are identified as injuries to all of the following except:
 - A. Muscles
 - B. Ligaments
 - C. Organs
 - D. Bones
2. Musculoskeletal diseases:
 - A. Happen immediately
 - B. Are multifactorial
 - C. Are due to poor diet
 - D. Are caused by genetics
3. Which is true of MSDs in dental providers?
 - A. Careers always end prematurely.
 - B. Static posture exacerbates symptoms.
 - C. Diagnosing the root cause is simple.
 - D. Injuries are skeletal, not muscular.
4. When should discussion of musculoskeletal disorders begin?
 - A. First year of dental hygiene training
 - B. During clinical courses
 - C. At continuing education seminars
 - D. When pain arises
5. What is another term for muscle knots?
 - A. Spasms
 - B. Tension
 - C. Neuropathy
 - D. Trigger points
6. Where are the most common injuries for clinically practicing dental hygienists?
 - A. Wrists
 - B. Neck
 - C. Hips
 - D. Legs
7. All of the following are improper modifications that practicing hygienists do to create better visualization except:
 - A. Bending over the patient
 - B. Overtwisting
 - C. Holding static positions
 - D. Using a saddle stool
8. Which of the following is a main factor driving hygienists to work through musculoskeletal pain?
 - A. Financial pressure
 - B. Demands from the office
 - C. None of the above
 - D. A and B
9. An example of an office design that is not accommodating to the provider is:
 - A. Adjustable stool
 - B. Variety of instrument designs
 - C. Computer directly behind the patient chair
 - D. Use of an ultrasonic scaler
10. In terms of ergonomics, what should a provider look for when selecting instruments?
 - A. Hollow instruments
 - B. Lightweight instruments
 - C. Grooved instruments
 - D. There is no one standard.
11. All of the following are recommended when selecting an ultrasonic scaler for optimal ergonomics and injury prevention except:
 - A. Generous length of the cord
 - B. A coiled hose connecting the handpiece to the unit
 - C. Lightweight
 - D. Handpiece with swivel motion abilities
12. Which of the following is correct regarding loupes?
 - A. Help to preserve optimal positioning
 - B. Require the hygienist to sit in a neutral position
 - C. Provide visualization for subgingival calculus
 - D. Can be shared among coworkers
13. In the dental office, what can cause hygienists to breathe with their chest instead of their abdomen and subtly hyperventilate?
 - A. COPD
 - B. Lack of exercise
 - C. Stress
 - D. Poor posture
14. What is another term for deep breathing?
 - A. Diaphragmatic
 - B. Accessory
 - C. Tachypnea
 - D. Costal breathing
15. Having a negative mindset and chronic stress impairs the ability to:
 - A. Focus
 - B. Retain information
 - C. Be motivated
 - D. All of the above
16. The position that is most recommended for a hygienist's sitting posture during patient care is:
 - A. Slightly hunched C curve
 - B. Slightly downward thigh posture and a slight anterior pelvic tilt
 - C. Moderate low back arch
 - D. 110 degree backwards pelvic tilt

Use this page to review questions and answers. Visit dentalacademyofce.com and sign in. If you have not previously purchased the course, select it from the Course Library and complete your online purchase. Once purchased, click the "Start Course" button on the course page. You will have an opportunity to review an online version of the article. When finished, click the "Next" button to advance to the quiz. Click "Start Quiz," complete all the program questions, and submit your answers. An immediate grade report will be provided. Upon receiving a grade of 70% or higher, your verification form will be provided immediately for viewing and printing. Verification forms can be viewed and printed at any time in the future by visiting the site and returning to your Dashboard page.

QUESTIONS

17. One of the most common postural dysfunction patterns involving the shoulder and cervicothoracic region is:
- Upper crossed syndrome
 - Thoracic outlet syndrome
 - Rotator cuff tendinitis
 - Lower crossed syndrome
18. A postural adaptation from unnatural positionings of the head and neck is:
- Thoracic kyphosis
 - Military neck
 - Lordosis
 - Forward head posture
19. Suggested natural methods for relief and reversal of musculoskeletal pain and adaptations are:
- Ibuprofen, yoga, meditation
 - Physical therapy, steroid injections, massage
 - Exercise, Tylenol, topical analgesics
 - Chiropractic, physical therapy, stretching exercises
20. One of the most common hand and wrist disorders in hygienists that is characterized by chronic compression of the median nerve is:
- Arthritis
 - Ganglion cyst
 - Wrist tenosynovitis
 - Carpal tunnel syndrome
21. The ideal breathing technique uses what muscle(s) to move air down into the body?
- Accessory muscles
 - External oblique
 - Diaphragm muscle
 - Scalene
22. Accessory muscle breathing can be a factor involving:
- Hyperventilation syndrome
 - Poor posture
 - Anxiety/stress
 - All of the above
23. Loosening of the joints, aligning the disks of the neck and spine, and releasing impingements are a few of the benefits that routine ___ care can provide.
- Chiropractic
 - Pain management
 - Physical therapist
 - Primary care physician
24. What type of therapy addresses the tender areas in weakened and overworked muscles with hands-on treatments?
- Trigger point therapy
 - Deep tissue massage
 - Foam rolling
 - Both A and B
25. What therapy uses electrical stimulation instead of medicinal intervention for nerve and muscular pain?
- Hypervolt
 - TENS
 - KT tape
 - None of the above
26. Which tape is used to provide good blood flow to areas of pain and/or injury and also promotes proper ergonomics?
- Kinesiology tape
 - Shanae tape
 - McDonahue tape
 - Faginey tape
27. The recommended time frame for effective trigger point therapy is:
- One treatment
 - Once all pain has dissolved
 - Until active and latent stages are dissolved
 - Until bruising appears
28. Who can administer vibration therapy?
- Physical therapists
 - Personal trainers
 - Self-use at home
 - All of the above
29. Dental hygienists are at what level of risk for musculoskeletal disorders?
- High
 - Medium
 - Low
 - No risk
30. What is the key factor in preventing musculoskeletal disorders for the dental hygienist?
- Chiropractic
 - Decreasing workload
 - Correct posture
 - Exercise

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EXPIRATION DATE:	JULY 2026

ANSWER SHEET

The impact of musculoskeletal disorders on the dental hygienist

NAME: _____ TITLE: _____ SPECIALTY: _____

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

CITY: _____ STATE: _____ ZIP: _____ COUNTRY: _____

TELEPHONE (PRIMARY): _____ TELEPHONE (OFFICE): _____

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Educational Objectives

- Upon completion of this course, the dental hygienist should be able to:
- Assess the need for ergonomic training through dental programs and continuing education courses
- Identify the most effective preventive techniques to prevent work-related injuries in dentistry
- Recognize musculoskeletal disorders commonly affecting practicing hygienists
- Discuss recovery and/or reverse effects of dental-related musculoskeletal injuries

Course Evaluation

- Were the individual course objectives met?

Objective #1: Yes	No	Objective #3: Yes	No	Objective #5: Yes	No
Objective #2: Yes	No	Objective #4: 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
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| 3. (A) (B) (C) (D) | 18. (A) (B) (C) (D) |
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| 5. (A) (B) (C) (D) | 20. (A) (B) (C) (D) |
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| 7. (A) (B) (C) (D) | 22. (A) (B) (C) (D) |
| 8. (A) (B) (C) (D) | 23. (A) (B) (C) (D) |
| 9. (A) (B) (C) (D) | 24. (A) (B) (C) (D) |
| 10. (A) (B) (C) (D) | 25. (A) (B) (C) (D) |
| 11. (A) (B) (C) (D) | 26. (A) (B) (C) (D) |
| 12. (A) (B) (C) (D) | 27. (A) (B) (C) (D) |
| 13. (A) (B) (C) (D) | 28. (A) (B) (C) (D) |
| 14. (A) (B) (C) (D) | 29. (A) (B) (C) (D) |
| 15. (A) (B) (C) (D) | 30. (A) (B) (C) (D) |

EXAM INSTRUCTIONS

We encourage participant feedback. Complete the evaluation above and e-mail additional feedback to Rachel McIntyre (rmcintyre@endeavor2b.com) and Laura Winfield (lwinfield@endeavor2b.com).

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Complete the evaluation above and e-mail additional feedback to Rachel McIntyre (rmcintyre@endeavor2b.com) and Laura Winfield (lwinfield@endeavor2b.com).

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