

Checklists not just for pilots, race car drivers

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_c.e. credit part 1

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Fig. 1 Type of occupational injury or illness experienced by dental hygienists with employment-related injury or illness, 2007.³ (Chart provided by the Center for Health Workforce and American Dental Hygienists' Association)

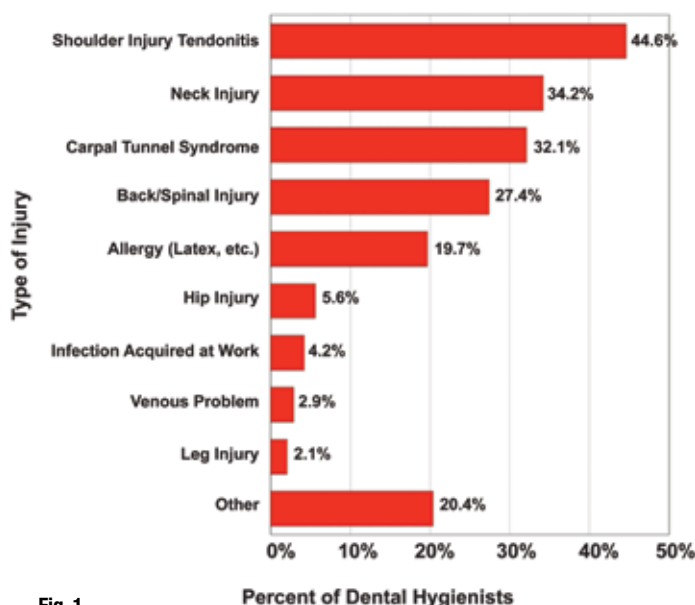


Fig. 1

Source: Survey of Dental Hygienists in U.S., 2007, CHWS, Question C.19a.
Note: Percents sum to more than 100% because some dental hygienists reported multiple injuries.

With popularity of the television show "Mad Men," 1960s themes such as war, racism and sexism are memorialized, as are once-common habits such as smoking. Women were marketed to in the 1960s with their own cigarette brand that had the catch phrase, "You've come a long way, baby." Following release of Smoking and Health: Report of the Advisory Committee to the Surgeon General of the United States,¹ all smoking-related advertising was banned from TV in 1970.²

Sit-down dentistry also evolved in the 1960s. "You've come a long way, baby" is gone from advertising, but it remains an accurate slogan when it comes to ergonomics in dentistry. We have come a long way, but for many dental professionals, that's still not far enough.

In 1937, pilots developed the concept of the checklist after planes began crashing. Dental professionals may not be crashing in the literal sense, but

many clinicians have been forced into early retirement because of musculoskeletal disorders (MSD) or they continue to try to work through them. By incorporating a checklist concept similar to that used by pilots, dental professionals can be more successful, productive — and able to practice without pain.

_Pain in dentistry

Pain of dentistry is a common fear that keeps patients away from the dental office. Pain in dentistry is common, but has nothing to do with the patient. The individuals having pain in dentistry are the practitioners. It is estimated that more than half of practitioners have some kind of painful musculoskeletal disorder that is work related.³

In 2007, the Center for Health Workforce, funded by the American Dental Hygienists' Association (ADHA), conducted a sample survey of licensed dental hygienists about a wide variety of issues, including occupational injury or illness related to their work. It was reported that just more than one-third (33.8 percent) indicated they had experienced an occupational injury or illness. Figure 1 shows the types and percentages of occupational injury or illness experienced. More than half (53 percent) used medication to control the discomfort and nearly half (49.5 percent) indicated they had shortened their work hours as a result of their injury or illness.⁴

Ergonomics evolved as a recognized field during World War II. It is the science of adjusting the work environment to the worker.⁵ The Occupational Safety and Health Administration (OSHA) has links to ergonomic information.⁶ The American Dental Association (ADA) published Introduction to Ergonomics⁷ with suggested interventions and in 2011 published Ergonomics for Dental Students.⁸ The ADA website has an ergonomics section with links to flyers about specific problems.⁹ Even with numerous articles and C.E. courses (both in person and online) on ergonomics in the five years since the ADHA survey, MSDs



Fig. 2



Fig. 3

continue to escalate. Much of this is because of a hand-me-down mentality in many dental offices.

For the safest flight, pilots use many checklists. In dentistry, a one-size-fits-all checklist is not enough to evaluate how we do things because of the wide variety of body types, shapes and preferred work styles. This article will develop checklists for dental-operator seating, just one of the many parts creating a healthy ergonomic environment.

Checklists help find the way

In the days of early aviation, pilots were crashing because they could not reach the controls. Investigators found it was pilot error as the cause. Pilot error doesn't necessarily mean the pilot did something wrong; it can mean the pilot wasn't familiar with the equipment or the equipment didn't match the pilot. For those who work in a temporary dental situation at multiple offices, ergonomic challenges are huge. When such practitioners walk into a new office, trying to match their individual needs to the available equipment is nearly impossible.

Pilot checklists were developed to match the steps needed for the job, making sure that everything is done and nothing is overlooked. Checklists have become fundamental to the aviation industry.¹⁰ In a similar way, checklists should become fundamental to the dental industry.

Two recent books, "The Checklist Manifesto: How to Get Things Right"¹¹ by Dr. Atul Gawande, a surgeon, and "Safe Patients, Smart Hospitals"¹² by Dr. Peter Pronovost, discuss checklists as an effective way to reduce medical errors. These books are not just about the checklists, they are about the culture of medicine and how the checklist can foster better teamwork. Checklists are starting to become common in some hospital settings, but not nearly common enough. It takes a change of culture to adopt something that on the surface can seem so simple — as a core strategy for enhancing care.

A recent success story illustrates the difference checklists can make in medicine. The intensive care unit (ICU) at a hospital is a crucial part of health care delivery and one of the most complex and expensive. The Centers for Disease Control (CDC) reported that nearly every patient admitted to an ICU experiences some type of complication during his or her stay.¹³ Checklists were used in the Michigan Keystone Project to make patient care safer in more than 100 ICUs in Michigan. The project targeted the expensive and potentially lethal catheter-related bloodstream infections that cost \$18,000 when a patient contracts one and causes 24,000 deaths per year. The Keystone team made a checklist, measured infection rates — and changed hospital culture. There was a 66 percent reduction in this type of infection statewide, saving more than 1,500 lives and \$200 million in the first 18 months of the program.¹⁴ It was the combination of checklists and the culture of teamwork that made the difference.

Racecar drivers and racecars take quite a beating during a race both physically and mechanically. Like pilots, race car drivers and their teams use checklists. The teamwork of a pit crew during a race is artistry to watch that is fostered by checklists. Steve Knight, once a professional Le Mans racecar driver (Figs. 2 and 3) and business turnaround specialist, has taken lessons from racing and brought them to dentistry. His goal is to turn around the world of seating for dental hygienists and all dental professionals.

Seating risk factor checklist

Before Knight got into a Le Mans car there were many considerations to be addressed. An impression of the driver's body is taken to ensure a perfect fit into the seat of the car for optimal performance. This molding created: proper leg-stretch to reach the clutch, accelerator and brake; comfort in reaching and holding the steering wheel; and most important, the ability to sit comfortably for long periods of time

Fig. 2 Steve Knight at LeMans.

Today, as a business turnaround specialist, Knight brings lessons from racing to dentistry. His goal is to turn around the world of seating for dental hygienists and all dental professionals. (Race photos/ Provided by Steve Knight)

Fig. 3 Steve Knight at Laguna. In racing, perfect driver ergonomics is critical. Knight's Goldilocks theory applies to a dental practice using existing seating simply because it was already there: Sometimes it's too tall or too short, and no matter how much it is adjusted, it is still not just right.

Table 1_Seating Risk Assessment Checklist (Table adapted from the Occupational Safety and Health Administration's 'Checklist for Ergonomic Risk Factors')

Things to look for	Questions to ask yourself
Prolonged hunched or elevated shoulders	Are your feet able to touch the ground?
Twisting head to side	Can you work in your patient's mouth comfortably?
Elbow flexed for long periods	With your arms comfortably by your side?
Wrists extended or flexed for long periods	Can you reach your instruments easily?
Prolonged sitting, especially in one position	How do you feel after one hour?
Lumbar back area not supported	How do you feel after two hours?
Feet dangling, not well supported	How do you feel by the end of the day?
Posture that puts pressure on the back of the thighs	Does your back sweat while sitting? Do your legs stick to the chair from sweat?
Twisted torso	Headache?
Frequent, prolonged leaning or reaching	Neck ache?
Neck extended backwards, head titled back	Leg numbness?
Neck severely flexed downward	Back pain?

while driving around the race course. Success for a top-level race car driver is driven by a strict regimen for eating, exercise and nearly all activities of daily life so they can be in top shape physically. It is the total package, including the racing team and pit crew all using checklists, that creates this success.

The idea of a form-fitting chair for dental practitioners might not be practical, yet think of the possibilities. Those same ideas can be brought into the treatment rooms with the "Seating Risk Assessment Checklist" shown in Table 1. This checklist helps to evaluate overall balance. Many professionals have damaged themselves by repeatedly sitting, leaning, stretching and twisting for so many years. As Cindy Purdy, RDH, BS, consulting with Crown Seating recently said to an online group, "Changing stools alone will not treat medical issues, but it can certainly offer benefits for the future."¹⁵

Recline/incline seating

Passengers are required to sit upright at take-off and landing on any plane (Fig. 4). Most passengers can't wait to hear the announcement that the cruising altitude has been reached so the seats can be leaned back for more comfort. Unfortunately, dental professionals tend to sit in this upright position all day. When seated in this position for long periods of time, practitioners both elongate and shorten different muscle groups in the legs. Humans are not meant to sit completely upright and especially not for a long day in the office.¹⁶

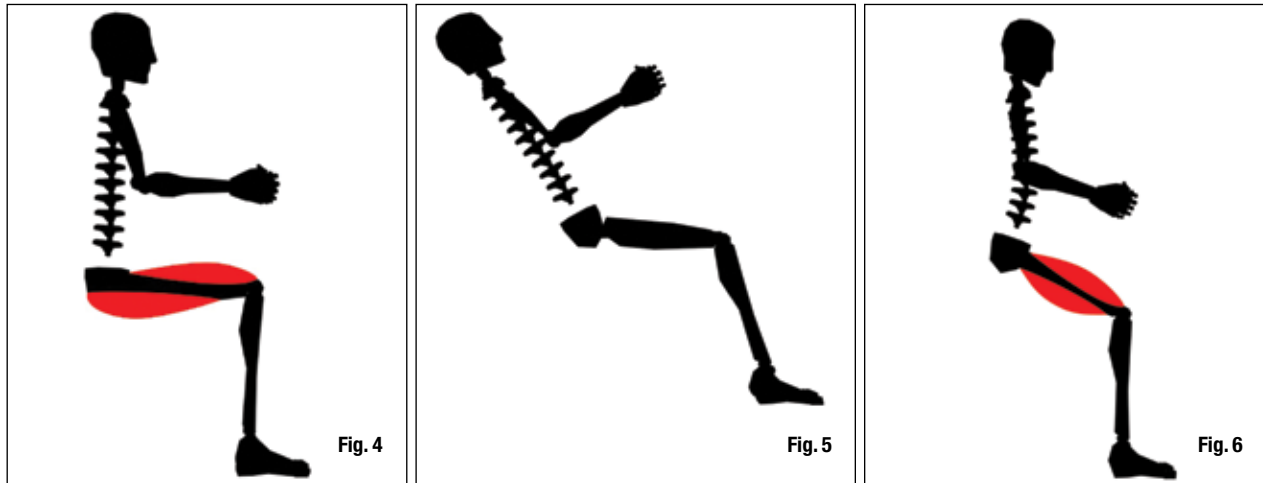
A more comfortable sitting position for most is in a reclined position (Fig. 5). Think of your comfortable recliner in front of the television after a long day of

work or the experience sitting in a first-class seat on a plane. Reclining is so very comfortable. This is the way racecar drivers sit; but it's not very practical for treating dental patients.

Now take that reclined position and rotate the torso on its axis to create the inverse position, called an inclined position¹⁷ (Fig 6). Incline is the automatic position created when sitting on a horse or a saddle stool. It is a more balanced position. This balance helps preserve the hips and spine in the proper position. It is defined as an open body position that is more comfortable, less harmful and allows for proper lumbar curvature. The pelvis rotates downward and forward, enabling the knees to stay below hip level. This creates less stress and strain on the back, neck and shoulder muscles. A slight incline of the seat (5–15 percent) is ideal. If you adjust more than 20 percent out of a neutral position for an extended period of time, muscle imbalances are created, which means the muscles are adaptively shortening on one side and elongating on the other. This results in misalignment of the spine and joints, and in this case, the hip joint. When a person sits properly on a saddle seat, the pelvis is properly positioned and stabilized, so the body naturally and automatically assumes the least-stressful position.

Static vs. dynamic seating

For sitting positions, there are two more checklist considerations. In traditional chairs, the practitioner sits in a static position that does not provide much movement or stimulation of the muscles. A new term has been given to some of the advanced-design chairs: dynamic seating. The dynamic chair offers the



option of movement, allowing the muscles to both contract and relax while one remains seated. Prolonged muscle contraction results in increased pressure of the blood vessels in the muscle, creating a decreased blood flow through the muscle. Blood flow assists in the repair and health of the muscles by delivering oxygen to the muscle and removing waste products in the muscle that might otherwise cause localized, intense pain (ischemia). A dynamic chair allows a period of rest and rebuilding for the muscles needed for healthy seating. In some dynamic stools the seat pan moves; with others it's the seatback that moves forward and backward as you move; and, with some, all parts of the chair move. In any case, these chairs help strengthen the body's core.

Seating materials

A chair can be made of rubber, plastic, leather, mesh or other man-made materials that may or may not breathe. These materials can make a difference in comfort depending on where you live. In the south, or if there is high humidity in the office, a practitioner might complain about the material of the seat. If there is sweating while sitting, the seat may not allow the legs and back to breathe. This can be uncomfortable and/or embarrassing. Asking the manufacturer about options for breathability is the best choice. There are new fabrics that control odor and stain-causing bacteria.

With or without arms

Many practitioners wonder if they should or shouldn't have arms on their chairs. The answer depends on how that individual works. If the person's arms are always flapping in the breeze because the patient isn't seated back properly, then arms on the chair will not help. It is imperative for the patient to either lay back in the appropriate position, or the

practitioner must stand. One suggestion is instead of saying "Ok, let's put the chair back and get started," the practitioner says, "Let's put the chair back and get *both* of us comfortable."

They are very similar phrases with very different meaning. Patients are not the only ones that need to be comfortable; the best work can happen when everyone is comfortable. How many times during the day do practitioners stop to get comfortable? Usually none. Health care providers often worry more about patient comfort and end up compromising themselves all day long, leading to pain and injury.

Goldilocks theory of seating

Chairs are often inherited from someone else when first employed in a different practice. Steve Knight's Goldilocks™ theory is like the old story, sometimes it's too tall or too short and no matter how much it is adjusted, it is still not just right. Not getting that just right position will lead to pain and other issues. Many companies can exchange the cylinder in a stool, for different heights to make it just right. Checking with the supplier or the manufacturer of the stool is the best way to find out if the cylinder can be changed to create a better fit. The important lesson is: Don't just try to live with it; it hurts the practitioner, the patients, and eventually, the practice's bottom line.

Considering alternative seating may be the best choice. Creating a checklist for buying a new chair (Table 2) can help you find the best one for your needs. A new chair may be needed because some chairs can't be jerry-rigged enough to fit. Other issues also play a part. Some patient chairs are extremely wide, or our patients can be very broad. This can make it impossible to work close enough when seated in a traditional stool. The saddle stool allows much closer access to the patient, so tasks can be accomplished with less stress.

Fig. 4 Traditional upright seating: Notice how this causes a stretching in the thigh muscles. (Drawings/ Provided by Crown Seating)

Fig. 5 Reclined seating.

Fig. 6 Inclined seating.

Questions to ask
Does the seat pan fit your shape?
What kind of height adjustments does it have?
What kind of lumbar support?
Does the chair have at least five coasters?
Is the chair static or dynamic? Which is best for the individual?
Does the seat pan decline?
How will this chair fit with the patient chair?
Does the company have fabric options?
Is the fabric breathable? Is it odor or stain resistant?
Does the manufacturer offer an opportunity to try it for a few days before you buy it?

Table 2. Checklist for buying a new chair

The professional should not have to reach more than 15 inches. The light, instruments on the bracket tray, the handpieces, the computer or anything needed for patient care should be within arms-reach. Straining for items stresses the muscles in the neck and shoulder. The biggest culprit is the overhead light. A headlight attached to loupes is no longer a choice; it is a necessary part of a healthy ergonomic environment.

Checklists and the culture of teamwork

Hospital checklists are saving lives and money. Pilots use several different checklists for every flight to prevent pilot error and crashes. Winning racecar teams and racecar drivers use checklists for every race. Dentistry can use checklists to great benefit as well. We've come a long way, yet dentistry still has a way to go. It won't happen without a change of culture. First, the problem must be recognized, hopefully before there is serious damage.

Dental professionals know that before there is a cavity, before there is periodontitis, before there is oral cancer; there is a risk for a cavity, periodontal disease and oral cancer. Preventive care and early detection is the purpose of routine hygiene care. Half or more of those reading this article already have MSDs; the other half are probably accumulating damage but haven't reached critical mass to experience symptoms.

Dental professionals are caring individuals who don't have to hurt themselves to help others. Ultimately not sitting comfortably hurts the practitioners, the patients and the practice bottom line. With simple ergonomic seating checklists professionals can be more successful at practicing in a pain-free environment.

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hygiene



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