CHAPTER 8
COMPREHENSIVE THERAPY AND TREATMENT MODALITIES

Is there a "magic bullet"? Yes, there is!

Nancy was referred to me by a physiatrist (a physical medicine and rehab physician) for problems with sleep and pain. The physiatrist was a seasoned doctor of forty-plus years who had been treating Nancy with acupuncture for her chronic pain for over two years. While they were having success with reducing her pain, the physician thought more could be done. He and I spoke extensively about the incidence of obstructive sleep apnea (OSA), how chronic pain disrupts sleep, and the relationship between insomnia and sleep apnea. He thought we could help, and he told me,

"I learned so much from you that I wasn't taught in medical school or my forty years of continuing education."

Now, this physician had to listen to me, because he's my father, Dr. Roger Klauer. Nonetheless, just as he has made me a better practitioner, it is humbling to know that I have also impacted his practice of medicine in a positive manner.

Nancy was having trouble falling asleep, and when she finally did, she'd constantly toss and turn and wake up repeatedly throughout the night. Mornings were always a challenge—she'd wake unrefreshed, and spent many days dealing with chronic sleepiness, headaches, and pain, the latter of which was finally diagnosed as fibromyalgia. At age fifty-five, Nancy had already been taking medication and treatment for chronic pain for about ten years and was also medicating her high blood pressure and gastroesophageal reflux (GERD).

Her victory? A good night's sleep. She didn't even consider pain relief among her victories. She just accepted it as part of life. It really pains me to know that some patients have become so desensitized when there are solutions available.

VICTORY

Nancy's victory? A good night's sleep. She didn't even consider pain relief among her victories. She just accepted it as part of life.

Rather quickly, our comprehensive examination pointed to undiagnosed sleep apnea as the culprit for her problems. Yes, her breathing at night was one of our highest concerns—no

surprise there. Again, nothing trumps the importance of breathing—or sleep, for that matter. In addition to the symptoms, we found that Nancy was a heavy snorer, had a scalloped tongue, and had profound nasal obstructions that grossly inhibited her ability to breathe through her nose.

Still, Nancy was a little apprehensive about undergoing a sleep test: "I don't sleep, so what will a sleep test show?" she wanted to know. A sleep test, I explained, would show us what was happening when she did fall asleep.

It's a good thing she came in for consultation with us and then ultimately agreed to the sleep study. Her results showed that she was waking from sleep fifty-four times an hour due to a breathing event. Her AHI was fifty-four! Nearly every single minute of the little sleep she did get was disrupted by a waking episode. When she was able to get into REM sleep—that deep sleep that helps with memory consolidation and cognitive function—she was waking even more often, up to eighty times an hour. So in that most valuable stage of sleep, she was waking more than once every minute. No wonder she was tired and miserable in the morning. I wouldn't want to fall asleep if I knew that I would stop breathing more than once a minute—I would do everything I could to stay awake and not suffocate. And that's exactly what Nancy was doing each night.

Nancy was excited about the results of her sleep test. For the first time in years, something quantifiable was identified as the cause of her symptoms. Better yet, it was something

that could be treated. That diagnosis of severe OSA by a sleep physician helped us develop a clear treatment plan for Nancy.

Nancy's situation was so severe that it took several modalities to treat her, including a referral to a sleep physician who was also an ENT (Dr. Doug Liepert, who wrote the foreword to this book).

As I've mentioned, sometimes a few practitioners must work closely together and constantly keep the channels of communication open so that the patient can achieve optimal health. Other providers that we often work with include ENTs, neurologists, sleep physicians, osteopathic physicians, chiropractors, family practice physicians, nurses, and physical therapists.

After so many years of suffering and pain, Nancy was happy to comply with our referral recommendations.

THE MAGIC BULLET

Often when people present with chronic pain and sleep problems, we're asked, "Is there a magic bullet?" There is a magic bullet, and it is attainable for most of our patients. Here's what it took to get Nancy to the finish line. Keep in mind that Nancy was dealing with fifty-plus years of suffering, suffocating, and long-term destruction. It took her a long time to get unhealthy and so broken down, so it would take several modalities to get her health back.

Orthotics

With TMD, the treatment modality we often employ is the use of an orthotic. In the TMD world, orthotics, splints, mouth guards, and appliances are often used interchangeably, but an orthotic is very different from a mouth guard or a splint. A mouth guard or splint is a static device that is used as a shim between the teeth and/or just something to grind on and protect the teeth. Splints and mouth guards aren't intended to be used while eating. An orthotic is intended to be used during eating, chewing, and speaking, and to be worn throughout the day to protect the TM joints from harm by keeping them in an orthopedically stable position.

An FDA-approved sleep appliance for OSA is often referred to as a "mandibular repositioning appliance" (MRA), "mandibular advancement device" (MAD), "oral appliance therapy" (OAT), or a "sleep appliance." These appliances are designed to prevent retrusion of the mandible to prevent it and the soft palate and the tongue from collapsing into the airway during sleep. However, if a patient has existing TMD symptoms and OSA, we can often make an FDA-approved sleep appliance that treats both sets of symptoms. People with OSA have a 3.6 times greater likelihood of having TMD.[33]

For maximum benefit when using these modalities, the sinuses and nasal passages must be healthy and clear. If the nose is blocked, the facial muscles will tighten up and

33 Steven Olmos, "Comorbidities of Chronic Facial Pain and Obstructive Sleep Apnea," *Current Opinion in Pulmonary Medicine* 22, no. 6 (November 2016): 570-5.

cause excess strain and an open-mouth posture. That strains the mastication muscles, those muscles used for chewing. If pushing on the muscles that move the jaw causes noticeable discomfort, and that is normal, that means there is chronic congestion present causing muscles to be tight and sore, and to activate/fire too frequently.

CPAP

A continuous positive airway pressure machine (CPAP) is a device that blows air through the nose and down the throat to help keep the airway open during sleep. The OSA sufferer wears a mask on their face at night that is connected by a hose to the CPAP. The American Academy of Sleep Medicine (AASM) recommends CPAPs for patients with severe sleep

apnea. For patients with mild to moderate sleep apnea, the AASM recommends oral appliances or CPAPs, based on patient preference or clinical evaluation.

Since Nancy's sleep apnea was so severe, the clinical guidelines recommended a CPAP as the first line of treatment. While many patients benefit from a CPAP, many also struggle with compliance, or regular use of the machine. In fact, research has found compliance with a CPAP to be as low as 17 percent.[34] On the flip side, compliance with oral appliances is typically 90 percent or better.[35] I don't want to give a negative impression of CPAP therapy, since it benefits many patients, but it's nice to know that there are several options for treating people suffering from these debilitating disorders.

Combination Therapy

Often with a CPAP, the patient's mandible still retracts back into their throat when they sleep, so their CPAP pressure must be extremely high. Using an appliance to stabilize the mandible allows for lower CPAP pressure and tends to increase compliance. Nancy needed combination therapy because her case was so severe and she initially struggled with the CPAP.

---

34 Weaver, Terri and Ronald Grunstein, "Adherence to Continuous Positive Airway Pressure Therapy," Proceedings of the American Thoracic Society, vol. 5 (2008): 173-178.

35 Ibid.

Surgical Techniques

There are surgical techniques that can help patients with more severe cases of TMD and/or OSA.

According to the American Academy of Sleep Medicine (AASM) Clinical Practice Parameters and Guidelines, oral appliances and CPAPs should be attempted first, prior to any surgical procedures, so we usually exhaust all conservative modalities prior to moving in that direction.[36] When surgery is necessary, we have a network of very talented oral surgeons that we turn to.

Since the success rate with TM joint surgeries is extremely low, we rarely recommend these; they are reserved as secondary or tertiary options for patients. Just as with CPAP, I don't want to give a negative impression of surgery of the TM joints, but in my practice, we rarely need to turn to surgery to achieve our patients' victories for the TMD. Now, with developmental abnormalities or trauma, then surgical procedures are sometimes needed and recommended.

Surgical procedures for OSA are on occasion used in conjunction with our treatment. These surgeries include removal of the tonsils and adenoids, partial dissection of the tongue, and maxillomandibular advancement, which involves moving the maxilla and mandible forward to help open the airway. Maxillomandibular advancement has as

36 Clete A. Kushida et al., "Practice Parameters for the Treatment of Snoring and Obstructive Sleep Apnea with Oral Appliances: An Update for 2005," *SLEEP* 29, no. 2 (2006): 240-3.

much as a 99 percent success rate but is extremely costly and takes some time to recover, so it is reserved as a last resort.[37]

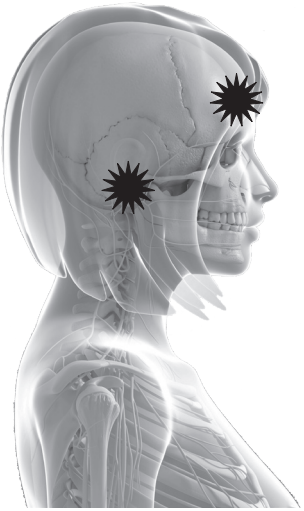
There are also older surgical techniques involving removal of part of the soft palate and uvula. However, since these are successful less than 20 percent of the time, they are rarely used anymore.

Trigger Points

Many people are familiar with the term "trigger points." A trigger point is an area in the connective tissue (fascia) or muscle that is painful when compressed. This compression can cause referred pain to other areas of the body. Drs. Janet Travell and David Simons define trigger point in their "bible" on the subject, *Myofascial Pain and Dysfunction: The Trigger Point Manual, Second Edition, Volume 1*, as: "A primary myofascial trigger point is a central myofascial trigger point that was … activated directly by acute or chronic overload or repetitive overuse of the muscle in which it occurs and was not activated because of trigger point activity in another muscle."

37 Paolo Ronchi, "Maxillomandibular Advancement in Obstructive Sleep Apnea Syndrome Patients: a Retrospective Study on the Sagittal Cephalometric Variables," *Journal of Oral & Maxillofacial Research* 4, no. 2 (April-June 2013): e5, accessed on U.S. Library of Medicine National Institutes of Health, February 20, 2018, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3886110/.

TRIGGER POINTS



In other words, a trigger point results from overuse of the muscle. A knot forms within the muscle and can refer pain to other sites of that muscle or associated muscles. Yes, pain in one area of the muscle can refer pain to a completely different area.

It's very important to be able to identify trigger points in patients, because TM joint problems, breathing problems, chronic forward head posture, car accidents, and different injuries can cause the development of trigger points. Until those trigger points are released, patients will experience pain or discomfort. What is just as important as identifying the trigger point is identifying the origin of it—what overuse is occurring to produce the trigger point.

According to Drs. Travell and Simons: "One well-performed trigger point injection can fully inactivate a trigger

point immediately." However, the authors say, identifying and releasing trigger points is not for everyone—patients with fibromyalgia and trigger points sometimes do not have the profound results of patients with just trigger points.

We commonly treat trigger points in the head and neck, since those directly relate to the symptoms we see. Therapies that we use to treat trigger points include injections of an anesthetic solution to help dissipate the trigger point and restore proper function to the muscle or muscle groups being treated. The trigger point technique is extremely valuable because it's very effective and conservative. The injection is superficial, staying clear of joint spaces or anatomical danger zones that can harm a patient. And the injection itself is not a caustic substance, it is simply an anesthetic solution. Other forms of trigger point therapy that we use include manual pressure and laser therapy.

Laser Therapy

Laser therapy, commonly known as cold laser therapy, low level laser therapy, or photobiomodulation therapy (PBMT), uses light to enhance the body's natural healing processes. Lasers have been used in medicine for many years. PBMT is not a surgical laser, but rather a therapeutic, non-cutting laser that does not cause pain when applied. Yes, surprisingly, shining a light on body structures decreases pain and increases healing.

The light used in this therapy is applied to the skin, allowing the light energy (photons) to penetrate tissue where

it interacts with various molecules (chromophores), resulting in different biological effects.

PBMT has photochemical, photothermal, and photomechanical interactions with the body that produce healing results. The photochemical interaction is direct transfer of energy to the biological substrates (chromophores). The photothermal interaction is conversion of light energy into heat, which promotes healing. And the photomechanical interaction is the absorption of light involving the formation of mechanical waves. This light energy can be directed over specific parts of the body to produce therapeutic results that are essential in the healing process.

To get it to the cellular level, the laser increases production of:

- ribonucleic acid (RNA), a molecule in the body that helps the body use proteins;
- ATP synthesis, which helps cells function better;
- macrophage activity, helping to repair tissues;
- cell proliferation, or the growing of healthy cells; and
- extracellular matrix production by fibroblasts and chondrocytes, which helps in healing.

PBMT also releases growth factors (for cell regulation), causes proliferation of T and B lymphocytes (types of immune system cells), and decreases mass effects in bone marrow. Those are some very technical explanations of laser

activity, but they illustrate that there's a lot going on at the physiological level as the laser is being applied to a patient's skin. PBMT is extremely safe and effective, and we have great references and resources for patients looking to learn and understand more about the treatment.

Basically, the laser has three main therapeutic effects: it decreases pain, speeds up the healing process, and helps repair broken nerves. In treating inflammatory conditions, PBMT is essential in attaining the results and healing for our patients. PBMT laser treatments range from three to fifteen minutes, and the application is comfortable without excessive heat or discomfort to the patient. I honestly could not practice without it. Our office currently has three units that are used all day.

Prolotherapy

Dr. George S. Hackett is considered to be the father of prolotherapy. He began using this technique around 1939, and it is currently used by many physicians and dentists like myself. Prolotherapy dates as far back as the gladiator days, when hot metal tips were inserted into joint capsules to repair strained and sprained ligaments—thankfully, that's not how the treatment works today.

Prolotherapy is the name some people use for a type of medical intervention for musculoskeletal pain that causes proliferation of collagen fibers, such as those found in ligaments and tendons, as well as shortening of those fibers. Collagen is composed of connective tissues that support the

body's structures. The "prolo" in prolotherapy comes from "proliferative."

Other therapists have referred to this type of treatment as "sclerotherapy." "Sclera" comes from the Greek word *sklero*, which means "harden." Sclerotherapy refers to the same type of medical interventions as prolotherapy—interventions that produce a proliferation of collagen fibers and thus a hardening of the tissue treated.

Prolotherapy is a valuable technique for helping with stretched, strained, and sprained ligaments around the jaw joint capsule and associated attachments to the mandible. These ligaments often get stretched from chronic, repetitive injuries (micro trauma) or from accidents (macro trauma). Selective injection into the areas where the ligaments connect to bone produce hardening or scar tissue to form and repair the stretched ligaments. Prolotherapy provides considerable relief and helps with healing following an injury.

Prolotherapy is not used on all patients, but it's a great technique to finalize the healing process. Prolotherapy is widely used by musculoskeletal pain physicians in other parts of the body to repair chronically strained ligaments and tendons. I am fortunate to work closely with the author of the best-known medical textbook on prolotherapy, Dr. Mark Cantieri. His book, *Principles of Prolotherapy*, is a great resource for physicians and dentists learning these techniques. I have trained with him one-on-one and we co-treat patients daily.

Myofunctional Therapy

As William Proffit's textbook *Contemporary Orthodontics* states, "Respiratory needs are the primary determinant of the posture of the jaws, tongue, and head. Therefore, it seems entirely reasonable that an altered respiratory pattern, such as breathing through the mouth rather than the nose, could change the posture of the head, jaw, teeth, and tongue."

Myofunctional therapy is the study and treatment of oral and facial muscles as they relate to speech, dentition, chewing, collection, swallowing, and overall mental and physical health. Proper tongue function is necessary for optimal nasal breathing. The tongue can be trained to rest in the proper position in the mouth to facilitate adequate nasal breathing rather than mouth breathing. Treatment usually includes a series of activities aimed at training and retraining the muscles of the face and oral cavity. These can't be learned overnight, but rather with time.

Activities for this can be supplemented temporarily with oral appliances that are designed to help patients develop the proper dental arch and adequate position of the tongue. Active treatment typically encompasses anywhere from three months to six months, followed by maintenance visits and a form of learning known as habituation. We have two trained and certified myofunctional therapists in our office who provide this service for our patients who need retraining of the oral, facial, and tongue muscles.

Nutrition

As we treat patients with chronic pain, we often have to draw attention to their food intake, because it can play a major role in their disease process. Patients often consume foods that work against their body's ability to heal or, in fact, create problems for our patients.

Generally speaking, we recommend a low-inflammatory diet. Excessive inflammation is the precursor to all disease processes, so anything we can do to lower inflammation can help the patient. While there are several good "diets," and a lot depends on the specific patient, a low-inflammatory diet means eating a diet of primarily unprocessed foods that is low in added sugar and artificial, manufactured substances. A clean diet with a good balance of protein and vegetables is what we strive for with most of our patients. Adequate water consumption and avoidance of artificial food additives and chemicals typically allows people to accelerate through the healing process.

These days, it is hard to know what we are eating, so we spend a great deal of time educating patients on their dietary choices. For patients with extreme circumstances, we have wonderful wellness partners in the community that we can turn to. Ultimately, we encourage our patients to read labels and understand what they are eating and how food can make or break their health.

The value of nutrition in treating a patient with chronic pain and sleep problems cannot be overstated. Often, the problems people are dealing with are reactions and sensitivi-

ties to the foods they are eating, and they don't even know it. By eliminating those foods, patients can begin to see results.

Wellness Coaching

While eating healthy is crucial to healing, it's also important to be physically and mentally fit. We offer wellness coaching through specially trained practitioners who help guide patients in adapting a healthy lifestyle, encouraging them to achieve and master the Triad of Health.

With all of the aforementioned therapeutic modalities, it's important that the evaluations and treatments are rendered by practitioners who have treated numerous patients and are keeping up with what's going on in the field. It's up to the practitioner to be responsible for using only methods that have been validated as effective by research studies.

NANCY'S VICTORY

In Nancy's situation, getting a diagnosis of sleep apnea was key to treatment. That's why we always evaluate a patient's breathing during their first visit. Since sleep comprises one-third of each day, discovering Nancy's problem was essential to achieving her victory.

Considering the severity of her OSA, CPAP was the first treatment initiated. However, it proved to be ineffective, because Nancy could not tolerate wearing the machine throughout the night. At the recommendation of her sleep physician, she returned to our office to initiate oral appliance

therapy, and we designed a custom oral appliance for her to use while sleeping to treat her OSA.

Once Nancy got comfortable with her oral appliance, she reattempted CPAP therapy at a lower pressure—using both treatments is known as combination therapy, discussed earlier in this chapter. The oral appliance allowed us to reduce her CPAP pressure, making it easier to tolerate the treatment. After the first night, Nancy noted a profound improvement in her ability to tolerate the CPAP mask every night. That's what we call a success!

We also recommended that she visit an ENT physician to repair the obstruction in her nasal airway. Once that correction was made, her ability to breathe improved greatly both day and night.

Lastly, but arguably just as important, we set her up with a wellness coach, who went over diet guidelines and exercises with her to help her be physically and mentally fit.

Through our coordinated care involving a sleep physician, ENT, wellness coach, and our oral appliance therapy, Nancy was able to achieve her victory.

Admittedly, her results took a little time; they did not happen overnight. Nancy's case was more on the severe end, but it illustrates so many facets of what we can achieve. Within a year of starting treatment, Nancy went from being extremely tired, never sleeping through the night, and consistently waking without feeling refreshed to having a far greater quality of life—she had more energy, got more sleep, and woke up feeling refreshed. She was also on a healthy diet,

which helped her lose and keep off *sixty pounds*, and she'd reduced the number of pain meds she was taking. Her severe sleep apnea was adequately treated via a CPAP and an oral appliance, both of which she wears every night and says she cannot sleep without.

I continue to see Nancy on an annual basis to ensure that she is maintaining her victory and enjoying life. Three years posttreatment, she continues to feel great. She has even become a spokesperson for our office and routinely attends our wellness events and workshops to help motivate patients who are having the same struggles as she had. She proudly shares her story and we are just as proud of her.

Nancy's case demonstrates how sleep apnea can produce years of pain and suffering. Her inability to breathe properly at nighttime and get adequate sleep was ruining her life. I estimate that she had been suffering from sleep apnea for at least thirty years.

That doesn't have to be the case for other people. Intervention and prevention at an earlier age can identify breathing and structural problems in youth, helping to stave off years of pain and suffering, medical expenses, and complications of issues. In the next chapter, I will discuss how TMD and OSA problems of adulthood can often be avoided if the structural issues of the mouth are addressed in childhood.