

A NEW PARADIGM OF MOTIVATION

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You can't make a silk purse out of a sow's ear unless you start with a silk sow—Robert Mager

The primary motivational techniques orthodontists typically use for encouraging patients to assist in their orthodontic treatments belong to one of three main psychological disciplines:

—Humanism, existentialism, or Maslow's "third force" techniques (1954);

—Psychoanalytic techniques developed by Freud;

—Behaviorism.

Intuitively, most orthodontists will use one or more of these techniques as they work with patients. Usually they simply imitate their own parents, teachers, or coaches and apply whatever techniques they learned while observing these role models. With this background, it is easy to see why orthodontic patient motivation remains such a haphazard affair and bears so little fruit. I will not linger on the psychoanalytical approach other than to describe its limitations, because I have no expertise in this field and it holds so little promise for orthodontists and their patients. Likewise, I have little to say regarding humanistic approaches; although familiar with the concept, I think they have rather poor long-range motivating ability. I have developed a fairly complete motivational system for orthodontists and their patients that blends behaviorism with genetic temperament. This technique enlists use of the personality features we cannot alter, while implementing effective measures to control the plastic traits of human nature. Much of this new paradigm of motivation depends upon reducing the discomfort delivered to patients. I will outline some of the methods I routinely use to apply this motivational method.

TRADITIONAL MOTIVATIONAL TECHNIQUES

Humanism

I often refer to humanistic efforts to motivate patients as the magic button technique. People who practice this technique believe that if they can

say or do the right thing, they will stimulate the patient to find within themselves a power to do something that clearly is to their benefit but ordinarily outside of their power. Military commanders as well as athletic coaches have made this technique famous and well-imitated, and there is not much doubt that spectacular results can result from such motivational procedures.

Unfortunately, there is scant confirmation that this much-heralded method works over as long a period of time as orthodontic treatment involves. Attempts to motivate by appealing to a person's available, but seldom used, potential usually ends up becoming doctor exhortation, and we should remember that exhortation remains the most used and the least effective behavior-changing tool known to man.

Freud's Psychoanalytical Approach

Most past efforts to gain orthodontic patient compliance, knowingly or not, have been modifications of the medical model popularized by Freud and used in his psychoanalytical approach to psychological problems (Watson and Tharp, 1985). The medical model assumes an inner cause for an outward symptom. Discovering and eliminating the cause has been the traditional psychoanalytical method of dealing with emotional or behavioral disturbances. Although the medical model has been useful in diagnosing and curing physical diseases, its efficacy for dealing with emotionally or behaviorally derived problems such as those underlying poor compliance by orthodontic patients is in doubt, for three reasons:

- There is no agreement as to its effectiveness;
- It calls for a special expertise that most orthodontists do not have, and, finally;
- The medical model makes no provision for patients to participate in their own treatment.

Behaviorism

Because behavioristic principles remedy these limitations of the medical model, they probably offer more hope to orthodontists for favorably altering patient behavior than other psychological approaches. The underlying basis of behaviorism is that consequences dictate behavior. There are three broad categories of consequences: positive reinforcers, negative reinforcers, and punishment.

Punishment, because it only can extinguish behaviors, not teach them, has limited use in orthodontics. Also, punishment must be severe to be

effective, such as electrical shock or emetics, and it is incapable of teaching new behavior. In fact, punishment often results in counterproductive behavior such as resentment, aggression, emotional arousal, and avoidance techniques. When orthodontists want to increase patient compliance, they should increase positive reinforcements while limiting negative ones such as pain, fear, frustration, and humiliation.

Orthodontists also will augment patient compliance by providing patients with feedback about their behaviors that is immediate, accurate, and specific. One cannot overemphasize the importance of delivering immediate consequences for behaviors, because learning is much faster and easier when there is close approximation of the behavior and its consequence.

Rewards for patients such as points or tokens that they can trade in for T-shirts, badges, or tote bags have proven effective in improving the compliance of some patients (White, 1974). Some patients remained unaffected by the token rewards, however; their resistance to change led to the discovery that these poorly compliant orthodontic patients had a low sensory tolerance for pain (White, 1983). When their toothbrushing pressures were measured with a highly sensitive strain gauge, it was found that they used four-and-a-half times less brushing force than did compliant patients.

Patients with poor oral hygiene typically have inflamed gingivae that injure easily, and when they place enough pressure to clean their teeth and stimulate the gums, they are punished with pain; whereas the avoidance of brushing rewards them with the absence of pain. Viewed from a behavioristic standpoint, it should not be surprising that certain patients have cause to avoid proper brushing.

One final word regarding the use of behavioristic principles: do not expect patients to do things for the benefit of others, e.g., their parents or the orthodontist. Most people, except the mentally deranged and totally altruistic, do things that primarily benefit themselves. When orthodontic patients have the skill but not the will to do something, look for the following (Mager and Pipe, 1984):

- It is punishing to perform as desired;
- It is rewarding to perform other than as desired;
- It simply doesn't matter whether performance is as desired;
- There are obstacles to performing as desired.

Table 1. Types of personality traits.

Trait	Easy child	Difficult child
Activity	low	high
Distraction	low	high
Regularity	regular	irregular
Approach/ non approach	approaches	withdraws
Adaptability	good	poor
Persistence	low	high
Mood	positive	negative
Sensitivity	insensitive	sensitive

When the immediate consequences of poor oral hygiene do not matter to the patient, orthodontists need to design a system that makes it matter a great deal, at least when they are in the orthodontic office. Finally, we need to make sure the patient has no obstacles to performing good oral hygiene such as not having a suitable toothbrush or having a fundamental misunderstanding of a good brushing technique.

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Low Sensitivity Threshold

The discovery of low pain tolerance in noncompliant orthodontic patients coincided with a study by Chess and Thomas (1987) that suggests the existence of a variety of temperaments based on personal traits that make a child easy or difficult to deal with. Table 1 captures the essence of the nine temperaments that make a child easy or difficult.

The most important of these personality features to orthodontists is the sensitivity threshold. People with an inherited low sensitivity threshold have diminished tolerances for all of the senses. What might be an acceptable tactile stimulation for a person with ordinary sensitivity will be painful for a person with a low sensory threshold.

For this reason, such people do not tolerate items such as wool sweaters, neck labels in shirts, new shoes, or tight clothes. They are highly selective about the foods they eat—their foods must have the right texture. These individuals also demonstrate an unusually high social sensi-

tivity and perceive insults where none are intended. Bright lights and loud or chronic noises irritate them greatly, so it should come as no surprise to orthodontists that they show little inclination to tolerate the demands, discomfort, and inconvenience of orthodontic therapy.

Many of the broken brackets and bands that occur with these low sensitivity threshold patients result when they touch, tug, and damage the appliances in response to discomfort. They will do whatever is necessary to diminish the pain and release their teeth from the traps that hold them, often demonstrating creativity in so doing. They will break the offending bracket by biting on a pencil, pen or ice cube. Some have removed their brackets with toenail clippers or wire cutters. The immediate, positive reinforcement these patients receive from the release of pressure teaches them to repeat this behavior when they experience pain. With awareness of this pattern of behavior, orthodontists can begin to understand why these patients pose such challenges.

Dental Behaviors of the Difficult Child

This heightened sensitivity to taste, touch, smell, aural, and visual stimuli explains why some patients are so resistant to orthodontists' instructions and encouragement to participate in their treatment. It also explains many of the behaviors associated with noncompliant orthodontic patients, such as poor oral hygiene, chronic complaining, easily fatigued jaw muscles, inability to open the mouth widely, copious salivation, frequently broken appliances, refusal to tolerate appliances, easily provoked gag reflexes, chronic mouth ulcers, TMD symptoms, and frequently missed appointments. These are just some of the common manifestations of low sensitivity threshold patients that require a special approach.

Rather than considering these patients as having character defects or poor attitudes, orthodontists should view them as turtles without shells (Fig. 1). Rather than try to change what probably is unchangeable, it might be better to identify these low sensory threshold patients at the outset and design their therapies so that they can cooperate enough to achieve an acceptable result.

Knowing beforehand what patients may do prepares orthodontists for those occurrences. For instance, parents and patients may easily believe that chronic intraoral ulcers result from their orthodontic appointments, leading them to accuse their doctors of infecting them with nonsterile instruments or of some other precipitating behavior. Orthodontists need to understand these ulcerations so they can explain the actual etiology in



Figure 1. A turtle without a shell might display an unusual sensitivity.

a convincing manner. And whether or not the explanation is accepted, orthodontists will need an effective remedy for quickly restoring patients' ulcerated tissues to health. The following prescription has served me well for many years:

Tetracycline syrup (or pharmaceutical equivalent), 60ml;
Benadryl elixir, 60ml; parenteral Kenalog, 40mgm.
Disp: 121 ml.
Label: Rinse with 1 tablespoon of liquid for 10-15 minutes.
Q.I.D. and spit out.

Patients can receive a systemic dosage by swallowing the liquid, but the Benadryl will cause drowsiness and should be used this way only at bedtime.

A good method of controlling the gag reflex of sensitive patients during impression taking enlists what psychologists call incompatible behaviors. With the eyes open, patients find it almost impossible to gag. I usually have these susceptible patients stare directly at my nose while I take the impression and also request that they raise their left leg as a diversion.

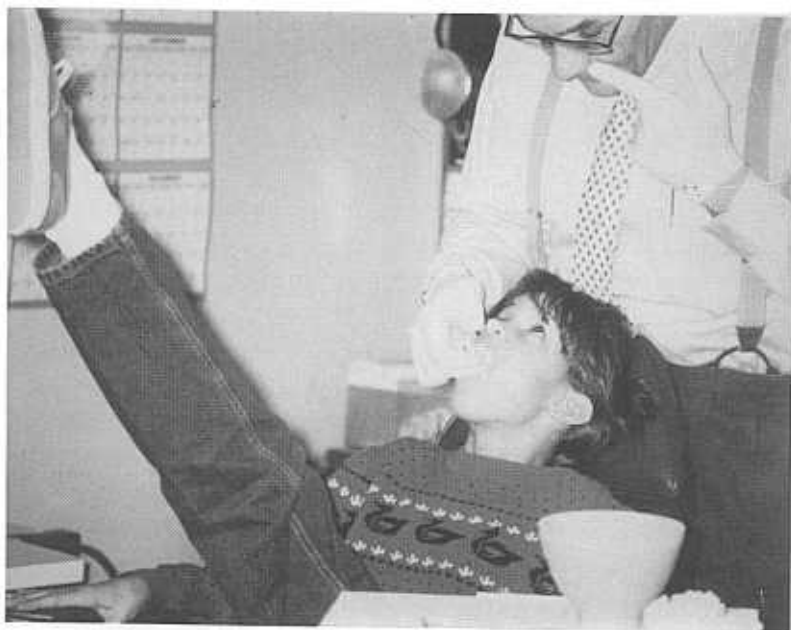


Figure 2. Patient lifting leg and keeping eyes focused on doctor's nose during impression.

The fatigue of holding the leg aloft also preoccupies the patient and prevents any mental rehearsal of previous episodes of vomiting when taking a dental impression. This technique does not eliminate all nausea during impression taking, but it dramatically reduces severe episodes of gagging (Fig. 2).

These high sensitivity patients seem visually impaired when it comes to seeing plaque on the teeth and brackets, so they benefit from the use of a plaque stain and close supervision of their brushing until they eliminate the stain. Poor brushers not only use light brushing pressure, but the brush velocity also is slow. Their brushing effectiveness is greatly improved by simply getting them to move the brush more vigorously.

The importance of making highly sensitive patients aware of their roles in temporomandibular dysfunction (TMD) cannot be overemphasized. Frequently, these patients will develop TMD symptoms during or following orthodontic treatment, and the orthodontist makes a convenient target

should patients or parents want to place blame. (Unfortunately, these distressed patients and their families often receive reinforcement from other professionals regarding the orthodontist's culpability. I would never say orthodontic responsibility for these episodes cannot happen, but it is neither frequent nor common. Orthodontists need to understand this and inform the patient and family about it.) In my experience, many adolescent TMD patients often have painful masseter and temporalis muscles brought about by chronic gum chewing or bruxism (or both), or hyperextended mouth opening from dental procedures. The subsequent chronic contracture of the masseter muscles will limit mouth opening and cause pain that frequently refers to the ear and the TMJ. The orthodontist should help these patients understand how these muscles and the TMJ cannot hurt without excessive pressure from the teeth being together too much. Humans were not made to clench their teeth together most of the time; as every dentist knows, the normal tendency is to have the teeth separated 2-3 mm in a physiological rest position.

When patients have chronic tooth-clenching habits, they also often develop joint noises as the synovial fluid is forced out of the TMJ. Once heavy occlusal pressures distort the quantity and quality of the synovial fluid, normal joint lubrication does not occur, and small joint anatomical discrepancies that ordinarily go unnoticed will cause interferences that muscles must overcome with an extra burst of force. When this muscular energy succeeds in overcoming the obstacle, a snap or pop is heard in the joint.

Not all joint noises arise from this scenario, but they often do in adolescents and young adults. Patients need to understand this sequence, and what they need to do to restore their TMJ health. The following steps do not make up a comprehensive list, but offer a good start to help patients relieve discomfort.

- First, patients must stop chewing gum completely;
- If wearing elastics aggravates the discomfort, discontinue use;
- Provide patients with post-it notes to place throughout their home and work environments as reminders to check their resting occlusion frequently; write only two words on the note—*teeth apart*;
- If a limited mouth opening accompanies muscle and joint discomfort, initiate vapocoolant-aided stretching exercises (Travell and Simon, 1983), along with ultrasonic heat therapy;

—Reassure patients that with their help, they will feel good again (and do not forget that it takes less stimulus for these patients to perceive pain, so relief may be a while in coming, and pain can easily recur).

Certainly, this discussion is an abbreviated consideration of a complicated topic, and as with many orthodontic problems, there is no universal diagnosis or treatment plan. For a thorough discussion of TMD diagnosis and treatment planning, I refer the reader to Bell's quintessential book, *Temporomandibular Disorders* (1986). This book belongs in every dentist's library.

TAME THE PAIN

Orthodontic therapy, because of its physiological basis, involves some discomfort. Orthodontists who hope to improve patients' cooperation with treatment must use strategies that tame the pain. The following suggestions represent some reasonable objectives for diminishing the pain and improving the cooperations of patients during their treatment (White, 1988):

- Limit the use of permissible appliances;
- Use bonded brackets instead of bands wherever possible;
- Use brackets with the maximum inter- and intra-bracket distance;
- Use the most resilient wires possible;
- Change the orthodontic forces gradually (shaping of forces);
- Use segmented arches so as to involve fewer teeth;
- Use continuous forces rather than intermittent forces;
- Prevent periodontal capillary strangulation through use of a bite wafer or chewing gum immediately after adjustments;
- Use analgesics (NSAID's) immediately after adjustments;
- Decrease gingival inflammation with improved brushing, antibiotics, chemotherapeutics and prophylaxis;
- Use the simplest mechanics possible.

ORAL HYGIENE FOR ORTHODONTIC PATIENTS

The reluctance to practice good oral hygiene has serious consequences for orthodontic patients, because it compromises and limits many of the treatment goals that are necessary for a successful outcome. When tissues are inflamed, they exhibit a special sensitivity to discomfort, and it then takes much less stimulus to evoke a painful response (Dubner *et al.*, 1978). With orthodontic patients, this situation causes a serious cycle of rein-

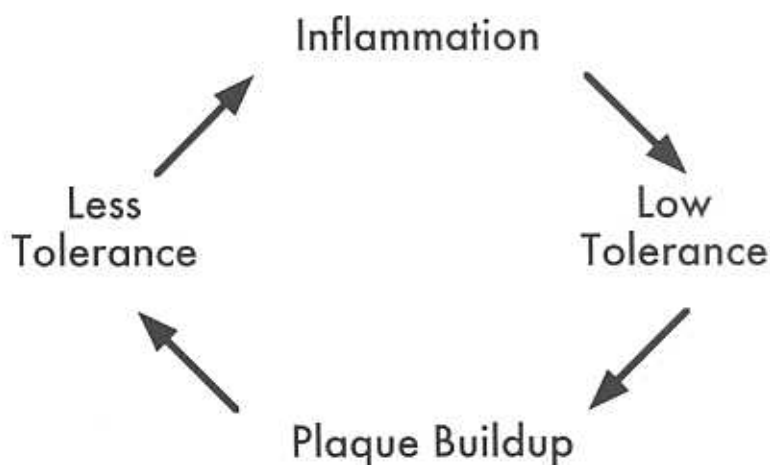


Figure 3. Cycle of inflammation.

forcing events that defies correction without aggressive therapy. Inflammation and increased sensitivity cause neglect, which leads to a further accumulation of plaque, in turn producing increased inflammation (Fig. 3). Figure 4 illustrates the gingivae of a typical patient with effective oral hygiene habits (A), and one with poor oral hygiene (B). Without unusually aggressive therapy, patients belonging to the latter group will often reach such a degree of gingival inflammation that orthodontic treatment must be interrupted so that special periodontal therapy can restore the patient's gingival health. Orthodontists should intervene before patients reach such a point, and exercise an aggressive remedial strategy that includes:

- Thorough prophylaxis by the general dentist or hygienist;
- The use of chlorhexidine rinse two times a day for several weeks;
- Oral medication of tetracycline, 250 mgm, four times a day for two weeks.

Figure 5 shows the effect of this approach towards chronic gingival inflammation.

Orthodontists need to involve the parents of patients who do not maintain adequate oral hygiene and keep them informed of both progress and problems. Failure to do so invites misunderstanding and resentment—usually at the end of treatment.

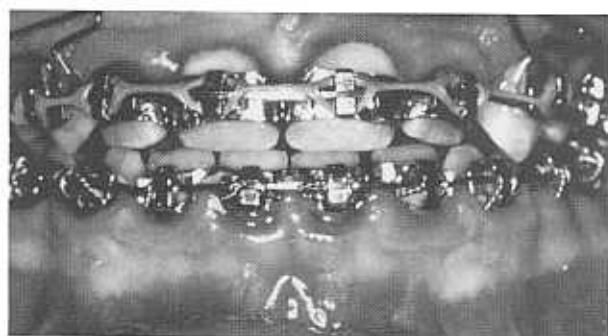
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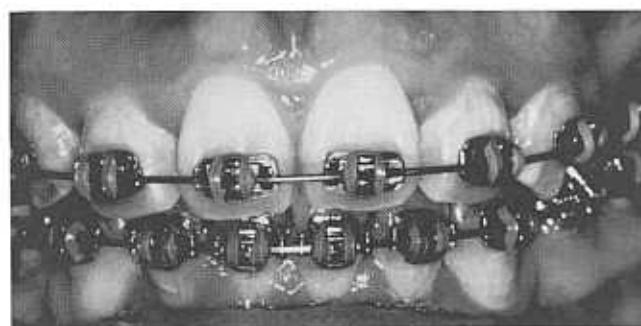
Figure 4. *A*. Typical poor oral hygiene patient with swollen gingiva, bleeding, and plaque. *B*. Typical good oral hygiene patient with no plaque, gingival swelling, or bleeding.

I invite all parents to attend each appointment with their child so that I can show them the poor oral hygiene highlighted by plaque stain, explain what has been done, and describe what I expect to happen from that day's treatment. The parent's presence is recorded in the treatment chart as a wide blue line across the chart (Fig. 6). When a patient's chart shows no blue marks, a special effort is made to talk with the parents by telephone or encourage them to visit the office. With these apparently uninvolved parents, the doctor must "inform, as you perform," to negate the potential for a claim of "professional negligence to disclose" in the event of a disappointing treatment outcome.

Orthodontists can hardly overemphasize the importance of good oral hygiene during the course of treatment because they know the potential



A



B

Figure 5. *A.* Patient with chronic poor oral hygiene before aggressive gingival therapy. *B.* Following prophylaxis, chlorhexidine, and tetracycline therapy.

damage from orthodontic therapy for the integrity of the teeth and gingiva (Ogaard *et al.*, 1988; Davies *et al.*, 1991; Dummett, 1951). An additional threat to the oral health of orthodontic patients recently was identified in the association between pathogenicity of oral flora and tooth mobility (Grant *et al.*, 1995). This association poses a special challenge for orthodontic patients, because teeth must become mobile before they can be repositioned. This finding explains why even serious gingival inflammation disappears after orthodontic treatment ceases and the teeth lose their mobility—with little change in the oral hygiene behaviors of patients.

Recently it also has been discovered that some pathogens actually thrive and receive nutrition from the polymer substrate with which we attach the brackets (Matassa, 1995), and, subsequently contribute to bond

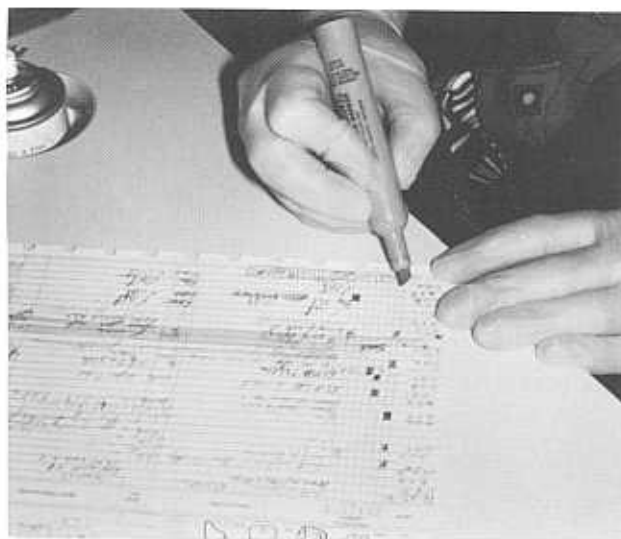


Figure 6. Assistant recording parent's presence at appointment in patient's chart.

failure, decalcification, and caries. Thus, excellent oral hygiene must accompany orthodontic treatment to control a number of risks to patients' oral health.

One of the most promising new oral hygiene aids orthodontic patients can use is the Sonicare™ toothbrush (Optiva Co., Bellevue, WA; Fig. 7). This brush is a quantum leap beyond ordinary or electric toothbrushes that rely on mechanical movement to remove plaque and stains from teeth. The ultrasonic vibrations produced by the Sonicare causes cavitation of oral fluids in addition to mechanical cleansing, to effect a reduction in gingival inflammation as well as an improvement in plaque scores of orthodontic patients (White, 1995). Figure 8 illustrates the differences in scores achieved in a group of chronically poor brushers provided with Sonicare™ toothbrushes and a similar group provided with ordinary manual toothbrushes.

My experience indicates that if patients will practice good oral hygiene, they will do just about any other task you give them. Certainly, there are exceptions to this general statement, but not many. On the other hand, if patients will not brush well, they will hardly ever perform any other duty



Figure 7. Sonicare toothbrush.

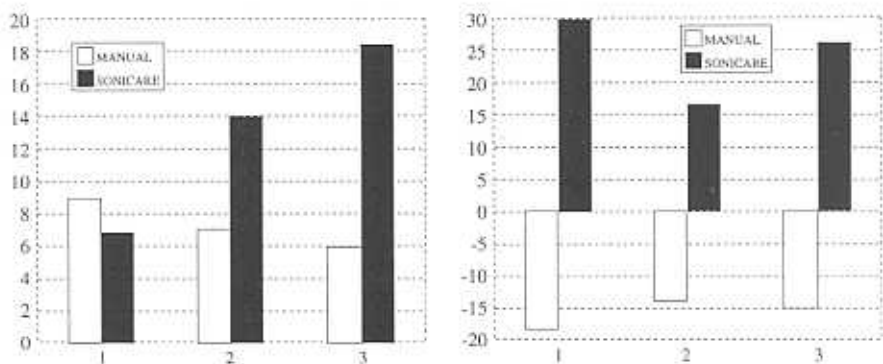


Figure 8. *Left.* Percentage reduction in plaque, as measured with Hygiene Analysis Index compared to baseline, with evaluations performed at approximately one, two, and three months. *Right.* Percentage reduction in bleeding, as measured with Modified Papillary Bleeding Index, compared to baseline with evaluations performed at approximately one, two, and three months.

that aids their orthodontic treatment. Although good oral hygiene seems secondary to orthodontic diagnosis and therapy, it is not. Without it, the entire treatment will be compromised.

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