As pointed out by many,\textsuperscript{14} orthodontic treatment involves much more than the knowledge and experience required for biomechanical movement of teeth. A successful clinical outcome with a satisfied patient also requires inherent and acquired psychosocial knowledge and interpersonal skills essential for managing the interactions among patients, clinicians, office staff, and other health professional colleagues.

With few exceptions, the training of orthodontists in principles of human behavior is generally limited to a pablum of psychology or possibly psychiatry. This deficiency is surprising, given the importance of the structure and function of the orofacial area to quality of life. The disproportionately large neuro-anatomical representation of the orofacial area in the sensory and motor homunculi,\textsuperscript{7} together with housing all the cranial nerves, also provides evolutionary evidence that the orofacial area is really the most essential part of the body, the remainder of the organs being only a support system. Thus, the mouth is essential for survival through intake of food and water; and for socialization dependent on communication through the speech apparatus provided by teeth, lips, and tongue and the muscles of facial expression for emotion. Perhaps the ultimate role of the orofacial area in the hierarchy of needs is to provide pleasure from gustation, olfaction, and sensuality; the antithesis being the sensory input associated with pain, displeasure, and disgust.\textsuperscript{6,7} There is little doubt of the relation of facial morphology to self-image and the motivation to seek help from orthodontists and/or surgeons.\textsuperscript{4}

Beginning with some practical applications of behavioral science methodology, it is important to first determine what is in the patients’ heads regarding their perceptions of the objectively measured morphology and function of the mouth, teeth, and surrounding orofacial area. Psychologists and psychiatrists have used many different methods to determine the contribution of the perception of the orofacial area to self-image relative to other attributes, such as intellect, athletic, and artistic abilities, which are included in overall self-concept. Specifically, orthodontists can use a variety of quantitative methods to assess the physical bases of perceived morphology or the ideational representation of the patients’ soft-tissue profile by self and others.\textsuperscript{4,5,19}

Using a unique computer-imaging PERCEPTOMETRICS method, Miner, et. al.\textsuperscript{20} found differences in accuracy of the self-perception of actual facial profiles and tolerance for
preferred morphometric changes among patients, mothers, caretakers, and treating clinicians. This method was also used for comparing facial profile preferences of patients and clinicians among several ethnic and gender groups.\textsuperscript{12,18,21} There are, of course, a number of computer imaging methods, using photogrammetrics, cephalometrics (3D and 2D), conebeam analyses, etc. with varying ability to accurately display soft-tissue changes for demonstrating possible clinical outcomes, e.g., 3DMD (www.3dmd.com), Dolphin Imaging (www.dolphinimaging.com/imaging.html).\textsuperscript{12,25} As described by Giddon,\textsuperscript{4} these techniques provide a series of static images from which patients can select, rather than a range of potentially acceptable results.

Every orthodontist knows that patients vary in their ability to accurately recognize or reproduce their own soft-tissue profiles\textsuperscript{4,24} and also are limited in their ability to indicate desired changes in their profile. Therefore clinicians should consider the use of psychophysical methods described above. Planning for treatment and the subsequent treatment and patient compliance can otherwise be frustrating for the patient and clinician. Such agitation often results in a range of normal neurophysiological autonomic responses and somatic behaviors of the patient, some of which may be inappropriate or disruptive. It is only when the magnitude or duration of these patient responses continues beyond expectation that the clinician may consider such behavior as abnormal. The cause of these aberrant verbal and motoric behaviors can vary from misperceiving normal sensory input from\textsuperscript{22} tactile, proprioceptive, and kinesthetic receptors to the understandably excessive reactions to extreme noxious stimulation of intero and extero receptors, e.g., pain or contrived distortion of self-profile.\textsuperscript{25}

While some stressors such as a disaster may evoke universally similar responses, most reactions to biological, physical chemical, and certainly psychosocial stressors vary considerably in their effects across different patients. Each individual, in fact, has an idiosyncratic hierarchy or pattern of psychological responses which is consistent across different stressors.\textsuperscript{26,27} Depending on the magnitude and duration, these behavioral and physiological responses may fall on a continuum from simple annoyance to severely disruptive psychopathology.

In order to help the clinician decide whether or not to modify diagnoses and treatment plans or expected compliance, it may be useful to provide a brief review of some of the mental disorders which orthodontists may encounter. Without specialized training, it is difficult and probably unnecessary for clinicians to try to discern personality disorders, which may be associated with other underlying psychoses. Briefly, the American Psychiatric Association\textsuperscript{28} has created “axes” to classify signs and symptoms into nosological categories with Axes I, II, and III being the most relevant for orthodontists. Axis I includes all psychiatric disorders except for personality disorders, which are classified under Axis II. Axis III is used to report major comorbid systemic diseases. For example, Axis I includes mood/depressive and psychotic disorders; and anxiety, attention deficit hyperactivity, obsessive compulsive, body dysmorphic, bipolar, panic and eating disorders (bulimia and anorexia nervosa). Axis II includes narcissistic, borderline, and antisocial personality disorders, among others.

In addition to traditional methods of orthodontic diagnosis, occlusal classification, cephalometric, and other quantitative imaging methods, one of the major psychosocial variables accounting for differences in patient management and satisfaction is variations in personality. Personality develops early in life from the interaction of genetically-based temperament with acquired experiences from the environment. Temperament, such as “easy babies,” “difficult babies,” and “slow-to-warm vs. quick-to-warm up babies,” may in fact be identified in infancy by nine dimensions as defined by: activity level, rhythmicity of hunger and sleep, approach/withdrawal to new stimuli, adaptability to change, intensity of reaction, threshold of responsiveness, quality of mood, distractibility, and attention span/persistence.\textsuperscript{29}
General Personality Characteristics Established Are Maintained Throughout the Lifespan Thus Influencing Past, Present and Future Behavior. Psychologists, from Freud (psychoanalysis),\textsuperscript{20} to Jung (collective unconscious-archetypes),\textsuperscript{31} to Maslow (Hierarchy of Needs),\textsuperscript{51} to Eysenck (extraversion – neuroticism – psychoticism),\textsuperscript{53} to Adler (superiority-inferiority),\textsuperscript{36} to Hathaway and McKinley (Minnesota Multiphasic Personality Inventory),\textsuperscript{36} to Rotter (locus of control),\textsuperscript{56} to Bandura (self-efficacy),\textsuperscript{57} to Goldberg (the Big Five),\textsuperscript{58} have offered useful definitions of measurable dimensions of personality in relation to the continuum from normal to abnormal behaviors. Depending on the situation, whether home, work, school, or health-care provider’s office, different personality types may be manifest in behaviors; ranging from complete compliance – e.g., keeping appointments, wearing retainers – to outright defiance of health-care providers.

Note also that some of the medications used to treat psychological disorders have oral or systemic manifestations, which may alter treatment plans and patient management. The most common of these side effects of oral health significance are those relating to salivary flow. Xerostomia, for example, has deleterious effects on oral hard and soft tissues, usually found with tricyclics such as Elavil; anticonvulsant mood stabilizers such as valproic acid; second generation antipsychotics such as Zyprexa; lithium; stimulants such as Ritalin; and somewhat with SSRI’s such as Prozac. Stimulants such as Ritalin may also cause dysphagia, sialoadenitis, stomatitis, gingivitis, glossitis, and glossal edema; valproic acid and Dilantin may lead to gingival hyperplasia.\textsuperscript{1}

Woe unto those clinicians, whether prosthodontists, orthodontists, or surgeons, who do not obtain some measure of a patient’s self-perception. A treatment plan must be based on realistic expectations of treatment outcome. Clinicians should be particularly wary of patients with body dysmorphic disorder who are often obsessed with perceived or actual imperfections in appearance, usually of the orofacial area.\textsuperscript{39} Because change in appearance resulting from orthodontic treatment is relatively a much slower process than that accomplished by the shorter-duration surgical intervention, patients require a longer time for their self-image to adjust to their new-found morphology. As pointed out by MacGregor, rhinoplasty patients often continue to hold onto their presurgical self-image. Psychological adjustment problems may be encountered; for example, when a rhinoplasty patient can no longer be able to blame continuing social problems on a previously dysmorphic nose.\textsuperscript{40} As noted, those patients with unrealistic expectations, such as those with body dysmorphic disorder, may have problems with compliance because of other more serious mental illnesses or systemic disease and its possible relation to prescribed medications or substance abuse.

For the nonpsychologist/nonpsychiatrist orthodontist, a few basic suggestions may help to manage the disparate sources of motivation for seeking out orthodontic treatment. As pointed out by Baldwin,\textsuperscript{41} Miner,\textsuperscript{29} Giddon\textsuperscript{1} and others, the patient, parents, caregivers, significant others, and even the clinician may all have different ideas of what should be accomplished by orthodontic treatment. One method for obtaining such information on the anthropometric bases of these perceptions has been indicated by Miner, et. al., earlier.

A number of mental-health professionals have provided a guide for recognizing and managing the so-called “difficult” patient; for example: 1. Dependent clingers, with increasing needs for reassurance; 2. Entitled demanders, who seem needy but attempt to control by intimidation, threat (veiled or overt), or inducing guilt, and may hide dependence with aggression; and 3. Self-destructive deniers who maintain previous behaviors (drinking, smoking), are profoundly dependent but without hope of having their needs met, and enjoy defeating attempts to help them.\textsuperscript{42}

While the source of difficulty is usually the patient, such aberrant behaviors may also trigger or bring out difficult characteristics of the clinician, such as unmet needs and anxieties, prejudice, etc. When the author has been asked to discuss management of the
apprehensive patient, the hidden agenda often is to discuss management of the apprehensive clinician. Patients can make clinicians feel vulnerable as the doctors become aware of their own limitations of knowledge and skills, and thus evoke negative feelings within the clinicians about the patients. The best advice is to set appropriate limits on patient behavior and emphasize realistic expectations of the outcome of the orthodontic treatment. For the patient with aberrant behaviors with no obvious cause other than the possibility of underlying depression, the clinician should refer the patient to a qualified mental health professional.

To be the competent clinician, orthodontists should also give some consideration to management of neurophysiological and psychological processes associated with pain and discomfort related to placement of appliances and mechanical movement of teeth.  

In summary, orthodontic practice is not ordinarily burdened by patients with significant psychopathology, the recent exception being the recognition of significantly more ADHD and autism spectrum disorders. However, clinicians should have an appreciation that orthodontic diagnoses leading to a successful treatment outcome result from an experience- and evidence-based knowledge of biomechanical and psychological principles.

References