Dentistry has been practiced for thousands of years. The ancient Chinese developed toothbrushes from boar bristles, and the Etruscans of ancient Italy carved false teeth from ivory. Remains of primitive humans have been discovered with indentations in their teeth, presumably caused by toothpicks and an early form of dental floss [1]. In addition to such evidence and secular historical reports, throughout the generations of the Tanach, Mishnah, and Talmud, until the Rishonim and Acharonim, Judaic literature has discussed dentistry and has given significant insight into its advancement through the ages.

In Tanach, the word “shen,” “tooth,” is cited 42 times. The first dental mention in the Torah refers to personal appearance and occurs in Bereishis (49:12), when Yaakov blessed Yehuda, “u’liven shinayim m’chalav.” Yaakov wished nourishment and plenty upon Yehuda by blessing him with teeth whiter than milk. The Torah also mentions teeth in the context of the judicial system, while referring to financial compensation in the words, “shen tachas shen,” “a tooth for a tooth” (Shemos 21:24, Vayikra 24:20). The physical reaction of teeth to food is described in Yirmiyahu (31:29), “kol ha’adam ha’ochel haboser tikhena shinav,” “any person who eats sour grapes, his teeth are set on edge.” Most references to teeth in Tanach, however, are metaphorical descriptions of force and command. For instance, in describing the downfall of the enemy, Zecharia said, “v’hasirosi… v’shikutzav mibein shinav,” “I will remove… [abhorrence] from between his teeth” (Zecharia 9:7), and in Eicha, the wrath of the enemy is described as “vayacharku shen,” “they gnash [their] teeth” (Eicha 2:16) [2].

Later references, including the Mishnah, along with its commentary in the Gemara and works of Rishonim and Acharonim, give more literal clues about dentistry and its development through time. The Mishnah proclaimed, “A gold tooth, Rabbi Meir permits [wearing outside on the Sabbath] and the Sages forbid” (Shabbos 6) [3]. Why did some Rabbis prohibit wearing a gold tooth outside on Shabbos? Rashi (Shabbos 65a) cited the opinion of his teachers who said that a person who wears a gold tooth in public may become embarrassed because a gold tooth clearly does not resemble the other teeth. Therefore the person might remove the tooth while not within an eruv and violate the prohibition of carrying [4]. The Arnei Nezer added an additional reason why gold teeth would embarrass a person: he noted that false teeth were very rare at that time and a person would not want to be seen with something so uncommon [5].

Rashi, however, disagreed with the reasoning of his teachers and stated that the person will eventually carry the tooth on Shabbos because he will be proud of the expensive prosthesis and will remove it to show it to others. The Maharsha offered support for Rashi’s opinion: there is a beraiusa which stated that R’ Yishmael bought his niece a gold tooth to enhance her appearance. Clearly, gold teeth were valued as a cosmetic enhancement at that time. There is a beraiisa which stated that R’ Yishmael bought his niece a gold tooth to enhance her appearance. Clearly, gold teeth were valued as a cosmetic enhancement at that time.

The Mishnah continued to state that silver teeth were permitted to be worn outside on Shabbos. According to Rashi’s teachers, silver teeth were not as noticeable as gold teeth and were not embarrassing; according to Rashi, silver teeth were not as expensive as gold teeth and were not worthy of display. From this halachic debate, we learn that dental prosthetics during the times of the Mishnah, Talmud and Rishonim were composed of several materials and even were removable. It is also interesting to note the emotions linked to the various restorative materials at different times: during the Talmudic era, gold teeth were valued, whereas Rashi’s teachers viewed them as unsightly and embarrassing [4].
The Gemara is replete with references to methods used to treat various dental ailments. In Kiddushin, it stated, “While drilling (lachtor) the tooth, it falls out.” “Lachtor” means to drill, indicating that dental drills were already being utilized in the time of the Gemara [3]. It is interesting to note that while drilling was discussed as early as the Gemara period, the use of modern drills is a relatively recent development. Drills are commonly used in dentistry to remove caries, or decay, from inside a tooth. Before drills were invented, dentists resorted to toothpicks or scissors to remove caries. In 1790, George Washington’s dentist invented a drill that rotated through use of a pedal, and in 1838 a “hand-cranked” drill was patented. Drills that operate with motors were not used until the 1860’s. Today, mechanical drills rotate up to 400,000 rpm and are used to very accurately and smoothly shape teeth for crowns and fillings, with minimal discomfort to the patient [6].

Rashi, however, did not translate “lachtor” as “to drill,” but commented that “lachtor” suggested a method to ‘cleanse the base of the tooth.’ Rashi described a scaling method, a procedure analogous to one still used today to treat periodontal disease [7]. Periodontal disease involves infection of the periodontium, the tissues around the teeth below the gumline, and can lead to bone and tooth loss. It is generally caused by accumulation of bacterial-laden debris beneath the gumline, which eventually forms calculus, or tartar, when exposed to the natural minerals of the mouth. A scaling procedure utilizes vibrating hand instruments to clean debris from below the gums. Scaling is usually performed with a procedure called root planing, which smoothes the root of the tooth to remove irregularities which could likely become the location of future buildup of bacteria [8]. Even in the times of the Gemara similar procedures were performed, as it said in Kidushin, “Scraping is a means of cleaning the teeth” [9].

The Gemara provided even greater insight into ancient dentistry. It described the use of wood, in addition to gold and silver, to replace teeth. In Shabbos 6:8c of the Talmud Yerashalmi, a story of a woman revisiting a “nagra,” a carpenter, to replace her tooth, was discussed [2]. Toothpicks were used to clean and align teeth (Tosafos Shabbos 5:1). In Chullin (16b) it stated, ‘A reed should not be used for this purpose because it may injure the gums’ [10]. In D’mai, a story is told of Rabbi Shimon ben Cabana and Rabbi Elazar walking together, when one asked the other, ‘Bring me a twig from the hedge to pick my teeth’ [11]. Extractions were also performed, but they were considered dangerous surgical procedures, as Rav warned his son not to have his tooth pulled (Pesachim 113a) [10].

The Ramham offered much information about dental ailments and remedies. He described a gold tooth placed “on top of a black or red one.” A nonvital tooth becomes blackened when the dentin layer is discolored by degraded blood cells, and a tooth may appear red when the outermost layer of enamel remains healthy but the internal pulp decayed [3]. Rav Ovadiah Milbarteneh, however, described teeth “with a changed appearance due to mold” [7]. Today we know that tooth decay, or dental caries, is a disease which affects vital teeth only. It is caused when bacteria, attracted to sugars on the teeth, ferment the carbohydrates into organic acids. The acids, formed on the outer surface of the tooth, or enamel, travel via tubules to the inner layers of the tooth, dentin and pulp. Using aniline dye, Dr. G.V. Black detected tubules with greatly enlarged diameters, as a result of bacteria traveling to the inner layers of the tooth [12].

In Regimen of Health, the Rambam listed several remedies for a toothache, among them cinnamon bark, coriander, vinegar, and raisins [10]. The oral health benefits of raisins have been scientifically proven just recently, centuries after the Ramham suggested raisins as a cure for toothaches! Dr. C.D. Wu at the College of Dentistry of the University of Illinois researched the possible contribution of raisins to oral health. By utilizing antimicrobial assay-guided fractionation and purification technique, compounds in raisins such as oleanolic aldehyde, linolenic acid, beta-sitosterol glucoside were found to prevent the growth of oral pathogens. These antimicrobial phytochemicals inhibited bacteria which cause caries and periodontitis. In addition, the proanthocyanidins in grape seed extract were found to aid in the reduction of root caries [13].

The importance of oral health to the general health of the body has been known for centuries, as the Yalkut Shimoni described, “The health of the body depends on the teeth” [9]. However, recent scientific studies are beginning to prove more conclusively the link between oral health and general health. Drs. Kaneko, Yoshihara, and Miyazaki found a positive correlation between the number of sites of root caries and C-reactive protein serum levels. Higher levels of this protein indicated an elevated risk of cardiac dysrhythmia and cardiovascular disease [14]. In addition, a study on Pima Indians with diabetes concluded that periodontal disease caused an increase in the number of diabetic complications due to increased blood sugar levels. When the periodontal disease was controlled, the diabetic complications decreased markedly [15].

The advances in dentistry today would not have been possible without building on the knowledge and achievements of previous...
generations. One particularly interesting modern development in dentistry is the use of dental stem cells to regenerate lost tooth and bone structure. Dental pulp stem cells, or DPSCs, are capable of renewal and differentiation, and studies have shown that DPSCs can form dentin, pulp, bone tissue, and crown structures [16].

In addition to DPSCs, other types of dental stems cells have been researched. Drs. Park, Jeon, and Choung obtained DPSCs, periodontal ligament stem cells (PDLSCs) and periapical follicular stem cells (PAFSCs) from molars of beagle dogs and allowed these cells to regenerate. PDLSCs were found to be the most effective in regenerating alveolar bone, cementum, nerves, blood vessels, and periodontal ligaments [17]. Mesenchymal stromal cells (MSCs) extracted from third molars were also utilized to derive stem cells. Through retroviral transduction of three transcription factors (OCT3/4, SOX2, KLF4), induced pluripotent stem cells, which were similar to human embryonic stem cells, were formed from MSCs [18]. Exfoliated deciduous teeth, or “baby teeth” may also prove to be a promising source of stem cells (SHEDs) which can regenerate tissues. Dental pulp was removed from deciduous teeth, and SHEDs were cultivated in cell culture medium. Analysis of these cells revealed that SHEDs did not degenerate in long-term experimentation [19]. Therefore, banking of exfoliated deciduous teeth may become popular in the future, as this method of storing a person’s own stem cells would be an effective and painless way to eliminate risk of immune rejection [20].

From the timeless verses of the Torah, through the palpable conversations in the Gemara and analyses of the commentators, we have traced references to dentistry throughout our history. By learning how our ancestors related to this field and how it has changed, we can gain a new appreciation for the development of modern dentistry and the contributions of our religious sources to this science.

REFERENCES