Evaluation of Sexual, Physical, and Emotional Abuse in Women Diagnosed with Temporomandibular Disorders: A Case-Control Study

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Purpose: To compare the prevalence of physical and sexual abuse in women with temporomandibular disorders (TMD) vs women without TMD. Methods: Forty women (age range 16–45 years) with idiopathic TMD were selected from the Occlusion Clinic at the Pontifical Catholic University of Rio Grande do Sul Faculty of Dentistry and were compared to 40 TMD-free women within the same age range. The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axes I and II and the Sexual Abuse History Questionnaire (S/PAHQ) were used to collect data. Results: Women with TMD diagnosed with myofascial pain had higher levels of chronic pain grade, disability points, chronic pain intensity, depression, and nonspecific physical symptoms with and without pain (ie, somatization). Women with TMD were significantly less educated, had lower family income, and were older than women without TMD. They also had significantly older partners, but there were no differences in the partners' occupation or education levels. Regarding emotional abuse, women with TMD reported significantly more insults and diminishing/humiliation in front of other people than the controls. The prevalence of physical and sexual abuse was higher in the TMD group, but this difference was nonsignificant. Conclusion: Emotional abuse, more than physical and sexual abuse, is an important risk factor for the development of TMD, even when controlling for education level, income, age, ethnicity, marital status, and occupation. Emotional abuse, as well as physical and sexual violence, should be assessed routinely in women suffering from chronic TMD. Int J Prosthodont 2018;31:543–551. doi: 10.11607/ijp.5828

Gender violence is a violation of human rights and a public health matter. This violence can be expressed in many different ways: physical violence, as in pushing, slapping, punching, choking, stabbing, shooting, and/or stoning; sexual violence, such as forcing a female partner to have sex with the offender using force, intimidation, coercion, extortion, manipulation, and/or threats; and psychologic violence or emotional abuse, such as mockery, insults, offences, threats, intimidation, omission/isolation, and/or manipulation. In all cases, the objective is the same: to control women's lives, with resulting harm to their psychologic health, self-determination, and personal development.1 Of these three forms of violence, psychologic violence is most difficult to detect and has been given little attention in the literature. Violence is usually perpetrated by a member of the family (ie, family violence) or by a male partner (ie, domestic violence); the latter is the most commonly found, most commonly practiced, most difficult to detect, and most difficult to study. Usually, health professionals are the first to have contact with battered women who come to health centers for treatment; however, these women often avoid telling the professional or try to hide it due to fear and shame.2

According to the American Academy of Orofacial Pain (AAOP), temporomandibular disorders (TMD) are defined as a group of disorders involving the masticatory muscles, the temporomandibular joint (TMJ), and associated structures. The most common signs and symptoms are pain and/or dysfunction in the TMJs and/or masticatory muscles, limitation of jaw

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movements, and TMJ sounds. It has been shown in the literature that psychosocial factors (ie, education and income level, depression, sleep, and nonspecific physical symptoms/somatization, with or without pain) seem to be more relevant in the development of TMD than traditionally believed occlusal factors. Interestingly, these same psychosocial factors also seem to be important in the perpetuation of TMD. Despite the type of treatment used, approximately 80% of patients improve, while 20% do not and usually present higher levels of depression and somatization than those who do respond to treatment. Among this 20% of chronic TMD patients who do not respond, it is possible that women who have suffered either physical or sexual abuse might be found and that this abuse might be the underlying cause of their orofacial pain and associated psychosocial factors.

 Patients with a history of physical and sexual abuse have shown very high levels of depression, which might have an important impact on the development and perpetuation of chronic pain. A study by the present research group showed that 80% of women who suffered domestic violence presented with mild to severe TMD chronic pain, 65% showed severe depression, and 60% to 70% reported severe somatization with or without pain. In addition, 85% reported pain in the face, temples, and ear in the last month with a recurrent pattern. All of these pain and psychosocial variables were measured by the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) Axis II.

 The main objective of this analytical retrospective case-control study was to verify whether sexual, physical, and emotional abuse could be risk or contributing factors in the development of TMD.

 Materials and Methods

 Inclusion and Exclusion Criteria

 In order to prevent selection bias and past memory, the sample in the present study was comprised of newly diagnosed TMD patients seeking treatment for the first time in the Faculty of Dentistry Occlusion Clinic at the Pontifical Catholic University of Rio Grande do Sul (PUCRS). The target population was individuals with myofascial pain only according to the RDC/TMD Axis I (ie, groups Ia and Ib: myofascial pain with or without limited opening). Only women between the ages of 16 and 45 years were selected in order to control age and gender as confounders.

 Patients were excluded if they were diagnosed with medical or dental emergencies (ie, acute muscle pain with muscle spasm/contraction, polyarthritis, acute trauma against the head) based on medical clinical history and dental clinical examination. Metabolic, neurologic, vascular, and psychiatric disorders were also excluded (ie, diabetes mellitus, hyperthyroidism, dyskinesia, trigeminal neuralgia, migraine headaches, hypertension, neoplasias, etc). Patients currently using medication or drugs acting in the central nervous system were also excluded (ie, muscle relaxants, anti-convulsants, opioids, and antidepressants). All these conditions described could interfere with pain perception assessed in Axis II of the RDC/TMD. Also, a sex-matched, asymptomatic (ie, no TMD spontaneous pain) control group in the same age range coming to the Faculty of Dentistry for restorative procedures was selected. Controls also underwent the RDC/TMD Axis I examination to confirm the absence of any TMD group diagnosis (ie, myofascial pain [group I], disc displacements [group II], and arthralgia/osteoarthritis/osteoarthrosis [group III]). The control group exclusion criteria were identical to those for the TMD group, with the additional criterion of absence of previous treatments for TMD.

 This study was approved by the São Lucas Hospital Research Ethics Committee (CEP/HSL No. 06/03193) at the Pontifical Catholic University of Rio Grande do Sul (PUCRS). All patients volunteered for the study without any financial compensation or change in the treatment protocol at the Faculty of Dentistry. All patients were given the same information about the study and signed the consent form.

 Study Design, Examination Methods, and Protocol

 This investigation was an analytical, retrospective case-control study conducted to compare the prevalence of physical, sexual, and emotional abuse between women with and without TMD. A retrospective case-control study design was chosen because this design allows for etiologic analyses when the latency period of the disease is long and/or when the incidence of the disease is low, as in TMD. A medical history and dental clinical examination were carried out prior to use of the standardized questionnaires in order to identify the patients who could be eligible for the study according to the inclusion and exclusion criteria.

 To assess signs and symptoms of TMD, the RDC/TMD Axes I and II were used. The RDC/TMD are a set of diagnostic criteria operationalized for use in the investigation of pain in the masticatory muscles, disc displacements, and arthritis/arthrosis/arthralgia in the TMJs, as well as for impact of pain on daily activities and for pain-related psychosocial evaluation. Axis I includes an examination of the traditional signs of TMD by the clinical examiner; in the present
study, it was used to select TMD patients with myofascial pain (Axis I, group I). The clinical examinations were carried out by a single examiner, who was the student in charge and who was blinded to the patients’ questionnaires. This methodology has been reported in the literature to have a Kappa index (intra-examiner) of 0.7, which is considered good.5 The RDC/TMD Axis II evaluates the psychosocial factors associated with TMD pain and the limitations in normal oral function. For the assessment of depression, nonphysical symptoms (somatization) with and without pain, chronic pain grade (CPG), chronic pain intensity (CPI), and disability points (DP), the Portuguese-translated and validated version of the RDC/TMD was used.15,16

For sexual and physical abuse, the Sexual and Physical Abuse History Questionnaire was used (S/PAHQ). The S/PAHQ has questions developed for population-level epidemiologic surveys about the history of physical and sexual abuse.17 The S/PAHQ has reproducibility and validity and has demonstrated high agreement with patient history of physical and sexual abuse obtained in broad clinical interviews.18 This questionnaire has been used in many studies on physical and sexual abuse in patients with chronic pain, including in TMD.8,9,17 In addition to the S/PAHQ, individual interviews were carried out in order to give an individual, not just collective, perspective of the impact of physical and mental abuse in the patients' lives and to provide information about the social networks available to help with their needs.

The research protocol was the same for both test and control groups: (1) information and signature of the consent form; (2) assessment of medical and dental clinical history; (3) assessment of the intensity, perception, and impact of TMD pain with the RDC/TMD Axis I, as well as the associated psychosocial factors and oral function; (4) assessment of sexual and physical abuse using the S/PAHQ; and (5) clinical examination using the RDC/TMD Axis I. This order was chosen to prevent an increase in TMD pain level caused by the clinical examination, which could alter the psychosocial evaluations with the RDC/TMD Axis II and the S/PAHQ.5,6,12

Control of Confounders, Sample Size Calculation, and Statistical Analyses

Neuropsychologic assessment (ie, depression and somatization) is extremely sensitive to many different confounders. Variables such as age, gender, chemical dependency, history of trauma, neurologic disorders, and psychologic status have been shown to influence cognitive tests.14,19 These variables were controlled for in the design stage by restriction in the inclusion/exclusion criteria. Time of day and the site in which the test was performed might have also influenced the test results due to diurnal pain fluctuation and external distraction. The clinical examinations and questionnaires were scheduled between 10 am and 4 pm because during this time period the pain fluctuation is minimal (less than 10 mm on a 100-mm visual analog scale [VAS]). Other confounders were controlled in the analysis stage.5

Since most data to be collected were categorical, which usually requires a larger sample size than continuous data, the formula for the calculation of sample size was designed for hypothesis testing of two population proportions.20 The sample size was calculated to detect a significance of 5% with a statistical power of 80%. The proportion of domestic violence between the two different groups was used for sample size calculation due to the fact that in Brazil, TMD prevalence among nonbattered women has been reported to be 36.2% on average and in battered women to be 80%, with CPGs in both populations ranging from I to IV.10,21 The sample size in each group to detect a difference in proportion between the two groups with the lowest difference (ie, 80% – 36.2% = 43.8%, or [P1 – P2]) was 35 individuals. This number was increased to 40 to compensate for dropouts.9 The case-control ratio was 1:1, which is considered ideal.22

A spreadsheet was created in Microsoft Excel 2010 and later converted and analyzed using SPSS version 20.0. Initially, a univariate analysis was performed to compare women with TMD to those without TMD (ie, no TMD or myofascial pain diagnosis only) for the RDC/TMD Axis II variables, the women's social and demographic characteristics, and the demographics of their male partners. Afterwards, a logistic regression analysis was performed with the significant variables found. When variables were categorical/recoded or had a normal distribution according to the Shapiro-Wilks test, nonparametric tests were used (Pearson chi-square, linear by linear association, Fisher exact test, Mann-Whitney U test, all 2-sided, P < .05); while if they were continuous variables, parametric tests were used (Student t test, P < .05). Finally, odds ratio (OR) for risk assessment and logistic regression for the adjusted OR calculation were performed after the univariate analyses. The critical OR was considered ≥ 2.0, as this threshold is considered to have clinical importance.23

Results

All subjects completed the study protocol, and there were no dropouts. The patient's recruitment time took approximately 2 years after approval of the project by the ethics committee.
Physical and Emotional Abuse in Women with TMD

All TMD patients were classified as muscle-related disorders (RDC/TMD Axis I, groups Ia and Ib) (Table 1). In the CPG classification, all TMD patients (100%) were included between grades I and IV, compared to only 35% in the control group. In the chronic pain DP, the majority (57.5%) of TMD patients had mild to severe disability compared to only 2.5% in the control group. The CPI was moderate to high in TMD patients, but at a very low level in controls. Psychosocial factors related to chronic pain were significantly higher in the TMD patients compared to the control group. The majority of TMD patients (80% to 82.5%) were included in the moderate/severe classification for depression and nonspecific physical symptoms (pain items included or excluded) against the normal/moderate classification in controls (80% to 82.5%).

Social and Demographic Characteristics of the Population

The data in Table 2 describe the subject demographics. The majority of TMD patients had a significantly lower level of education than controls, with only 1 out of 3 with postsecondary education in the patient group compared to 3 out of 4 in the control group, which increased the risk of being a TMD patient by more than 7 times. Additionally, the patient group also had higher levels of unemployment than the control group, which also increased the risk of developing TMD by more than 7 times. TMD patients had significantly lower income than controls, which increased the risk of developing TMD by more than 4 times. A significant difference between the two groups was also found in average age; TMD patients were significantly older than controls, despite the age range specified in the inclusion and exclusion criteria. Despite patients in both groups being predominantly from urban areas, the patient group was 4 times more likely to come from a rural area compared to the control group (25.7% vs 0.0%, respectively), increasing the risk of becoming a TMD patient by more than 2 times. Both groups self-declared themselves as Caucasian and were predominantly Roman Catholic, with no significant difference between the two groups; however, the patient group had more than twice the prevalence of self-declared black or mixed populations. In summary, women’s education level, occupation, family income,
age, and place of residence were found to be risk factors for TMD development.

Table 3 describes relationship status and the demographics of the male partners. Half of the TMD patients were either married or living with a partner in the same household compared to approximately one-third in the control group, and no difference was found between the two groups. Both groups were involved in long relationships; however, in the patient group, the relationship duration was significantly longer than in the control group. No significant differences were found in the male partner’s education level.
level between the TMD and control groups, although there were lower levels of education in the TMD group. Significant differences were found between the two groups regarding age and employment. Male partners of women with TMD were significantly older and were 2 times more likely to be unemployed; in fact, unemployment of a male partner increased the risk of developing TMD by more than 4 times. With the exception of age and occupation, male partners’ social and demographic characteristics did not differ between the two groups.

Physical, Sexual, and Emotional Violence

The vast majority (75% to 97.5%) of women interviewed in both groups reported never having suffered emotional or physical violence (Table 4). Emotional variables were far more prevalent (12.5% to 25%) than variables for physical or sexual violence (5% to 7.5%) among TMD patients and were far more important as risk variables for TMD development. A prevalence of only 2.5% in the control group was found for both emotional and physical/sexual violence. In the emotional variable analyses, the patient group reported to have suffered 10 times as many reports as those in the control group. This variable alone increased the risk of having TMD by 13 times; this finding was significant ($P < .05$). When adjusted for significant confounders (ie, women’s education level, income, age, ethnicity, marital status, and occupation), the adjusted OR increased the risk by 20 times ($P < .05$) (Tables 2 and 3). Similarly, the variable diminishing and/or humiliation in front of other people was a significant difference between the two groups, with the patient group having a much higher prevalence (ie, 8 times more) than the control group. Consequently, this variable increased the risk (ie, OR) of developing TMD by almost 10 times ($P < .05$); and, in the adjusted OR, this increased to 12.7. Scaring/intimidation was not significant between the patient and control groups; however, it increased the risk of TMD development by more than 5 times; and, in the adjusted OR, this increased to 10.4 times. In the physical and sexual variable analyses, slapping and throwing objects, forced sex, sex by fear, and humiliating and degrading sex gently increased the critical OR (2.1), but this risk was reduced to 1.8 after controlling for the confounding variables, and this result was nonsignificant. Pushing, stumbling, and shaking alone increased the risk of developing TMD by more than 3 times, but this was reduced to 2.4 in the adjusted OR and was nonsignificant.

<table>
<thead>
<tr>
<th>Table 4</th>
<th>Physical, Emotional, and Sexual Abuse in Women with TMD vs Asymptomatic Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TMD ($n = 40$)</td>
</tr>
<tr>
<td>Insulted by partner, %</td>
<td></td>
</tr>
<tr>
<td>No = 0</td>
<td>75.0</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>25.0</td>
</tr>
<tr>
<td>Diminished/humiliated you in front of other people, %</td>
<td></td>
</tr>
<tr>
<td>No = 0</td>
<td>80.0</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>20.0</td>
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<tr>
<td>Scared/intimidated you, %</td>
<td></td>
</tr>
<tr>
<td>No = 0</td>
<td>87.5</td>
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<tr>
<td>Yes = 1</td>
<td>12.5</td>
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<tr>
<td>Slapping or throwing objects at you, %</td>
<td></td>
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<tr>
<td>No = 0</td>
<td>95.0</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>5.0</td>
</tr>
<tr>
<td>Pushed/stumbled/shook you, %</td>
<td></td>
</tr>
<tr>
<td>No = 0</td>
<td>92.5</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>7.5</td>
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<tr>
<td>Forced sexual relations, %</td>
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</tr>
<tr>
<td>No = 0</td>
<td>95.0</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>5.0</td>
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<tr>
<td>Sexual relations by fear, %</td>
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<tr>
<td>No = 0</td>
<td>95.0</td>
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<tr>
<td>Yes = 1</td>
<td>5.0</td>
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<tr>
<td>Humiliating/degrading sexual relations, %</td>
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</tr>
<tr>
<td>No = 0</td>
<td>95.0</td>
</tr>
<tr>
<td>Yes = 1</td>
<td>5.0</td>
</tr>
</tbody>
</table>

$^a$Fisher exact test.

$^b$Chi-square test.

$^c$Adjusted for women’s education level, income, age, ethnicity, marital status, and occupation.

0 = low-risk stratum; 1 = high-risk stratum; OR = odds ratio. CI = confidence interval; NS = not significant.
Backward logistic regression with TMD vs non-TMD as the binary outcome variables and insulted, diminished/humiliated, scared/intimidated by partner as predictor variables (chosen for having the highest ORs in Table 4) yielded insulted by partner as the best and only outcome variable (Hosmer and Lemeshow Test for classification table = 61.3%).

Discussion

The results confirmed that all variables that characterize a TMD patient were significantly different between TMD patients and controls. It is important to stress that these patients were patients with muscle disorders, which usually have more reported disability and psychosocial levels than those with arthrogenous pain. It will be important in future studies to assess other TMD subgroups in this context.

The present results are in agreement with the literature. Many studies have shown that women who have suffered violence develop psychosocial, behavioral, and somatic disorders, such as anxiety, depression, chronic fatigue, back pain, restlessness, insomnia, undesired pregnancy, headaches, alcoholism, drug use, and unsafe sex, among others. Another study showed that 1,727 men and women who suffered abuse during childhood presented more health problems and pain complaints than those with no history of abuse.25

There might be an explanation for why women who have suffered sexual, physical, and emotional abuse have a higher prevalence of TMD than those who have not, as demonstrated in this study and in the literature.10,21 Depression and sleep may exert a primordial role in the development of TMD and orofacial pain, as well as in treatment prognosis.4,5,12 In addition, the use of sleep and anxiety medication by female victims of violence is greater (40% and 74 times greater, respectively) than in women who are not victims of violence.26 The identification of psychosocial problems is very important because these patients, particularly women with a history of abuse, present very high levels of depression and sleep problems, which will have an impact in the development and perpetuation of chronic pain.9,27-29

Many studies have shown a significantly higher prevalence (44% to 66%) of specific chronic pain conditions in women with a history of physical and sexual abuse compared to those without such history, including fibromyalgia, gastrointestinal pain, back pain, headaches, and pelvic pain.17,27,28 Specifically for TMD and orofacial pain, a study has found that 44.8% of TMD patients had a history of physical and sexual abuse compared to 33.3% of asymptomatic controls; however, this difference was not significant. Another study found that 49% of TMD patients also had physical and sexual abuse histories.29 In both studies, similar to the present study, only women were assessed, considering that they comprise 80% of the TMD population and have higher vulnerability.

The majority of TMD patients had lower levels of education than controls, higher levels of unemployment, and lower levels of family income. They were also older and had a higher proportion of people from rural areas compared to controls (25.7% vs 0.0%, respectively), despite being predominantly from urban areas (74.3%). All these variables were significantly different from controls. Most women in both groups had been pregnant, and the average number of children (nearly two) was also similar between the two groups, which was similar to the Brazilian average of 1.8 children per couple.30 Some variables have been associated with violence against women in the literature, such as the woman’s age, level of education (and that of the partner), social class, duration of relationship, partner’s occupation, number of children, and prevalence of minor psychiatric disorders.31 One Brazilian study that assessed the prevalence of TMD in female victims of domestic violence found similar results: The majority of battered women had lower levels of education, with an average age of 34.7 years compared to 38.0 years in the present study. They also found that ethnic self-classification, lower level of social and economic status, and presence of the Roman Catholic religion were very prevalent in this vulnerable group.10 The findings of the present study agree with the lower level of social and economic status, but not with the ethnic distribution nor the religious beliefs. Similarly, the present study partially agrees with one that determined that the profile of battered women is young, married, and Roman Catholic with children, low level of education, and low family income. Therefore, the common sense among studies is that abused women are young adults, married with children, and with a low level of education and family income. Family income might indicate a financial dependence on the partners, which perpetuates the abuse to protect the children.

Women’s male partners in the TMD group were not significantly different than those in the control group regarding education level, but were significantly older and had higher levels of unemployment. These findings point toward social and economic foundations for the aggression. This is in line with a study that found that male aggressors have lower levels of employment.1 The present study also agrees with a study by Progianete et al, which found that male aggressors showed higher levels of education, were the major source of income, and were older than their female partners.10 In the present study, the average age of
the male partners was also higher than that of the women. According to one study, the main reasons for battered women not leaving their partners were: the aggressors have promised to improve (58%); the need to support their children (48%); the economic dependency (38%); the love for the partner (27%); and the fear of the abuser (27%). These results, in agreement with the literature, have clearly indicated that social and economic issues, particularly economic dependency (ie, low education level, employment, and family income), might be major risk factors for situations of abuse besides the traditional male partner role.

In the present study, only a small number of women in the TMD group reported physical and/or sexual abuse (5.5% to 7.5%), but a much higher proportion of women with TMD reported emotional violence (20% to 25%). After controlling for social and economic variables, the emotional variables in combination increased the risk of developing TMD from 9.8 to 13.0 times, compared to 2.1 to 3.2 times for the physical aggression variables in combination. This is important, as most studies usually concentrate on the physical violence rather than on the emotional violence, which is far more frequent with consequences that are just as important. The numbers in the present study are in agreement with those in a population-level study that showed 55% of the violence against women is psychologic in nature, compared to 38% physical and 8% sexual.

Therefore, physical and sexual violence in general and emotional abuse in particular should be screened regularly in female patients with TMD. Future studies should concentrate on female TMD patients who do not respond to treatment to assess if the history of emotional, physical, and sexual abuse might be the underlying cause of TMD. In addition, future studies should confirm these findings with larger samples, considering that the sample size in the present study was calculated based on a large difference found in TMD prevalence between battered and nonbattered women, and this difference might be smaller in different countries.

Conclusions

This study has shown that emotional abuse—more than physical and sexual abuse—is an important risk factor for the development of TMD, even after controlling for education level, income, age, ethnicity, marital status, and occupation. Therefore, future studies dealing with this issue must include emotional abuse in addition to physical or sexual violence and study the relationships of these variables with TMD etiology. In addition, it has been shown that women’s economic dependency on the male partner, children’s needs, and time in the relationship are important factors in the perpetuation of a violent relationship.

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References

The translucency of 5Y-PSZ approaches that of LiDi, and both are superior to 4Y-PSZ and 3Y-TZP. When can even reach that of 4Y-PSZ (864 N) is superior to the 5Y-PSZ (715 N) and can even reach that of 4Y-PSZ (864 N), while 3Y-TZP still holds the highest load-bearing capacity (1,195 N). Theoretical analyses agree with experimental observations. The translucency of 5Y-PSZ approaches that of LiDi, and both are superior to 4Y-PSZ and 3Y-TZP. When adhesively bonded to and supported by dentin, LiDi exhibits similar load-bearing properties to 4Y-PSZ but much better than 5Y-PSZ.