Perception of Oral Status as a Barrier to Oral Care for People with Spinal Cord Injuries

Amy L. Sullivan, RDH, PhD

Abstract

Purpose: The purpose of this study was to examine the oral health status of people with spinal cord injuries (SCIs) and determine if people with a SCI have an accurate perception of their oral status, and if this is potentially a barrier to oral care. Methods consisted of a survey and oral examination given to 92 willing participants of the Methodist Rehabilitation Center who sustained a SCI. The examination consisted of periodontal status using Periodontal Screen and Recording IndexTM and dental status using Decayed, Missing, Filled Teeth index. Oral health score was also determined through questioning the participant. These scores, retrieved by the dental hygienist, were then compared to what the SCI individual’s perception of their own oral health. Results indicate their perception of oral health was much better than dental assessment showed. Additionally, more than 18% of this population was completely unaware of decay which was found in over half of those studied, and more than 60% were unaware of periodontal disease that was exhibited in over 75% of those studied. This comparison evaluated a major awareness about the need for education and oral care among the SCI population.

Keywords: dental hygienists, spinal cord injuries, barriers to oral care

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Introduction

According to the American Association of People with Disabilities, 19% of the American population (49 million) have a disability.1 Of this population, approximately 255,702 sustained a spinal cord injury (SCI), with approximately 10,000 to 12,000 new SCIs per year.2,3 According to the Mississippi Department of Health Spinal Cord and Traumatic Injury Registry, approximately 1,500 people with a SCI are living in Mississippi.4 This incidence rate in Mississippi, calculated without including pre-hospital mortalities, is more than twice the national average.5 Primary risk factors for new SCIs are largely attributed to Mississippi’s high rate of motor vehicle crashes, low safety belt usage, poor road conditions, violence in high crime neighborhoods and falls.5–7

While the Surgeon General’s report addresses the relationship between overall health and oral health,8 very little research has been conducted on oral health among people with SCIs. The literature review provides an insight to the SCI individual’s access to dental care dilemmas and perception of own oral health. The results may serve as a foundation for developing programs and policies to improve oral care for people with SCIs, such as special training, clinics that specifically address SCI oral needs, better usage of dental hygienists, provision of transportation, education and governmental economic support for oral health care among people with SCIs.

The hypothesis of this study states that people with SCIs perceive their oral health status as better than the dental experts’ examination scores. More people with SCIs will think they have a healthy mouth (“Do you think your mouth is healthy?”) compared to the actual Oral Health Score (OHS). Fewer people with SCIs will think they have cavities (“Do you think you have cavities?”) compared to the actual Decayed, Missing, Filled Teeth (DMFT) score. Finally, fewer people with SCIs will think they have gingivitis (“Do you think you have gum disease?”) compared to the actual Periodontal Screen and Recording IndexTM (PSR).

SCIs can cause loss of movement (paralysis) and feeling below the site of the injury. Paralysis that involves the majority of the body, including the arms and legs, is called quadriplegia or tetraplegia. When SCIs affect only the lower body, the...
condition is called paraplegia. In general, people with SCIs are more prone to develop diabetes, hypertension, obesity, bladder infections, depression and wounds, such as pressure ulcers. Individuals with SCIs must also learn to control or respond to autonomic dysreflexia, psychosocial and quality of life issues. Their general needs include management of urinary tract, gastrointestinal tract, integumentary system (pressure sores), cardiovascular system and neurological system. Issues pertaining to these systems are taught and reinforced during rehabilitation. More specifically, SCI patients with an injury lower than the seventh cervical vertebra (C7) should ideally be able to independently accomplish all activities of daily living with the exception of walking. In individuals with a C7 and higher SCI, the focus turns towards meeting primary goals such as self-care and bladder and bowel care. Hence, the SCI population often has difficulty participating in activities of daily living. Foremost among these restrictions is the access of health care services.

People with SCI often face greater barriers to care than those in the able population. In general, barriers that may limit maintenance of proper oral health include a lack of dental professionals on the rehabilitation team, fear, lack of transportation, lack of accessibility to the dental office and lack of financial assistance. Overcoming these potential barriers to oral health care among the SCI population requires a better understanding of their oral care, practices and perception of their dental status.

Dental professionals are typically not members of a rehabilitation team and dental clinics are not a part of rehabilitation centers. It is a dental professional who will more likely recognize gingival conditions and/or dental decay compared to all other caregivers. Dental care should be coordinated with other health care professionals. Dental care is less complex while the disabled is still in a rehabilitation facility that includes an on-site dentist rather than waiting until the patient is home relying on a caregiver, although most caregivers are the ones who are instrumental in taking the disabled to the dentist. Modifications to routine procedures may also be indicated, such as proper airway position and wheelchair transfers. This coordination would be more easily accessible in rehabilitation centers which can include the appropriate professionals all in one setting.

Persons with disabilities report a high level of fear, anxiety and nervousness towards dental visits. Although it may be thought that this is true among the entire population and not just those with a disability, only 20% of the overall population reported being nervous versus 34% of the special needs population. Perhaps this is due to the lack of regular dental care that has not been easy to access, or perhaps it is due to an unpleasant past dental experience. The point is that many more dental appointments would be kept if sedation were offered to those who were anxious.

Within the environment of the dental office are several factors which contribute to the barriers of dental care. Scheduling and keeping appointments, enduring wait times, dealing with dental staff, feeling rushed, gaining access, filing insurance and coping with the actual dental chair or cubicle space are among some of these office barriers. Excessive wait times, while an inconvenience to most, create special problems for SCI clients. The reports of excessive wait times were generally dealing with Medicaid patients as opposed to those paying with cash. This can be a serious problem for the fact that most SCI patients have bladder, bowel and pressure ulcer issues and they will need to be treated in a timely manner. Also, if wait times are minimal, this leaves less time for the client to be nervous. Some patients perceived the office personnel as being rude, disrespectful, judgmental and insensitive to their disability or the fact that they had Medicaid. Others report after waiting for long periods of time that the dentist was rushed and did not spend adequate time treating them. These experiences create strong barriers for some and discourage dental care in general. Although transportation is provided through social services for those who do not own or cannot drive a car, this service was considered unreliable and inconvenient. The 2 barriers of transportation and scheduling appointments, when combined, make the possibility for being late or not making the appointment at all a strong likelihood.

Dental offices must follow the guidelines provided by the Americans with Disabilities Act. Dentists are required to make reasonable modifications to facilitate access into the dental office by providing wheelchair ramps, spacious washrooms with grab bars at the correct level, raised toilets, widened paths and doorways and parking. Dental professionals can also learn certain techniques to help transfer the SCI patient into the dental chair. Dental offices must become more accessible to the physically challenged.

Underutilized dental services are not surprising, due to the fact that many people who sustain SCIs are deprived socioeconomically. Most den-
Table I: Descriptive Statistics of SCI Subjects (n=92)

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
</table>
| Age                       | Range: 18–71  
Mean: 41                                        |
| Age of SCI occurrence     | Range: 15 to 69  
Mean: 33                                        |
| Race                      | Caucasian: 55%  
African American: 45%                             |
| Gender                    | Male: 72%  
Female: 28%                                        |
| County                    | Rural: 46%  
Urban: 54%                                         |
| Income                    | Don’t know: 25%  
$14,000 or less: 35%  
$15,000 to $34,999: 16%  
$35,000 to $64,999: 17%  
$65,000 and above: 7%                                      |
| Education                 | Not completed high school: 30%  
High school graduate: 57%  
College/technical graduate: 13%                              |
| Living situation          | Institutionalized: 17%  
Live in partner/spouse: 65%  
Self/alone: 17%                                      |
| Upper extremity function  | Can’t bring hand to mouth: 18%  
(A17% cervical injury)  
Able to bring 1 hand to the mouth: 82%                      |
| Independence for Oral Health | Can’t do without help: 15%  
Needs help with set up or supervision: 12%  
Needs a special device or extra time: 8%  
Can brush w/o help: 65%                                  |
| Daily oral habits         | Brush: 84%  
Floss: 14%  
Mouth rinse: 48%  
Tobacco use: 33%  
Mouthstick use: 13%                                     |
| Dental insurance          | None: 50%  
Medicare/Medicaid: 26%  
Private: 24%                                       |
| Health insurance          | None: 2%  
Medicare: 5%  
Medicaid: 35%  
Private: 22%  
More than 1 of the above: 35%  
Workman’s comp: 1%                                      |

Until recently, literature was not available specifically on the oral health of those with SCIs. The general foundation for the above literature review which spawned this study was supported by extrapolating data from studies pertaining to those with special needs and making the link to those with SCIs. Since this study’s completion, a few new studies specifically related to oral health of those with SCIs have been released. These studies also support the above literature review stating that half the people with SCIs report current oral problems, have barriers to oral care, are less likely to have had dental cleanings than the general population and potentially have more dental caries.30–31 Although many barriers pose a huge problem, lack of the actual perceived need appears to be the biggest barrier among people with special needs.32 Research is still very limited on this topic. This study will add to the current literature on the perception people with SCIs have of their own oral health. Preventive services have contributed to the decrease in the incidence of dental disease over the years, therefore, this perception of perceived need must be changed.33
Table II: Oral Health Status Levels Determined By Oral Health Score (OHS) (n=92)

<table>
<thead>
<tr>
<th>Valid</th>
<th>Frequency</th>
<th>%</th>
<th>Valid %</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>91 to 100 – Good</td>
<td>17</td>
<td>18.5</td>
<td>18.5</td>
<td>18.5</td>
</tr>
<tr>
<td>81 to 90 – Not that bad</td>
<td>27</td>
<td>29.3</td>
<td>29.3</td>
<td>47.8</td>
</tr>
<tr>
<td>70 to 80 – Oral care and treatment is needed</td>
<td>19</td>
<td>20.7</td>
<td>20.7</td>
<td>68.5</td>
</tr>
<tr>
<td>Below 70 – Oral cavity should be sorted out immediately</td>
<td>29</td>
<td>31.5</td>
<td>31.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>92</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Methods and Materials

People with SCIs who received care at Mississippi Methodist Rehabilitation Center were asked to participate in a study to examine oral health status among Mississippians with SCIs. Only those who had obtained the spinal injury over 6 months prior to the exam were used. Approval for the research project was obtained through the institutional review boards of the University of Mississippi and Methodist Rehabilitation Center. People with SCIs having any heart/valve conditions following the 2007 American Heart Association guidelines were excluded from the study. Even though traditional dental treatment was not being provided to these individuals, placing a periodontal probe below the gingiva could cause unnecessary bacteria to enter into the bloodstream. In addition, individuals with SCIs and an artificial joint replacement within the last 2 years were also excluded from the study per the advisory statement issued by the American Dental Association and American Academy of Orthopedic Surgeons.\(^{34,35}\) Exclusion criteria for this study were chosen to ensure the safety of participants and ensure that antibiotics were not used unnecessarily. For safety reasons, medical records were reviewed by the dental hygienist upon request. After informed consent was gathered, an oral survey and dental examination was given to a total of 92 individuals with SCI.

Indices used for dental evaluation were OHS, PSR™ and DMFT. The OHS consisted of 8 questions, each scored 0 to 20 points, that calculated a numerical measure of a patient’s oral health status. Some questions were worth up to 20 points, while some a maximum of only 10 points. The total score ranged from 0 to 100 points. Each of the following categories were set according to the OHS guidelines provided by Denplan Excel practices (widely used in the United Kingdom) described as:

- **Good** (scores totaling over 90)
- **“Not that bad”** (scores ranging from 80 to 90)
- **Treatment needed** (scores ranging from 70 to 80)

Raw OHS were also gathered and compared. Information gathered for OHS included patient comfort, assessment of caries (decay), assessment of wear, assessment of periodontal status, assessment of occlusion, assessment of mucosa and a general assessment of dentures if applicable. This outcome measure was selected because it included the pa-
tient’s perception, provided a valid representation of oral health, granted easy use and required minimal training for administration.\textsuperscript{36}

The DMFT score represents the number of teeth that exhibit caries in adults. To arrive at the overall DMFT score each tooth received a D for decay, an M for missing or an F for filled.\textsuperscript{37} Scoring was based on 32 teeth with only 1 letter representing each tooth. If a tooth had been restored yet had additional decay the tooth was classified as a D. Scores were averaged and each participant received an average D score, M score and F score, as well as DMF score. The DMFT does not represent the extent of disease and is preferred for prevalence studies. Therefore, D, M and F were each measured independently.

Periodontal disease was measured by using the American Dental Association’s PSR\textsuperscript{TM}, a modified community periodontal index of treatment needs, which measures gingival condition using a scoring scale of: healthy (0), presence of bleeding (1), presence of calculus deposits (2), presence of shallow pockets (3), presence of deep pockets (4), any abnormalities (such as recession above 3.5 mm, mobility and mucogingival involvement) (5, typically noted as PSR\textsuperscript{TM}'s asterisk) and edentulous patients (6, typically noted as PSR’s x). Scores are calculated by using the worst or highest number per sextant (the oral cavity is divided into 6 portions). The need is then categorized into: no periodontal treatment is needed (0), oral hygiene is needed (1), professional cleaning is needed (2), oral hygiene instructions and professional cleaning are needed (3) and complex treatment (such as deep scaling by dental hygienist or referral to periodontist) is needed (4 and 5). A score of 6 that was given to those few patients that were completely edentulous indicated it was too late for periodontal treatment. This score was calculated by using the worst or highest score of all the sextants combined.\textsuperscript{38}

In addition to the examination, a short survey asking demographic information and specifically...
asking 3 perception questions was given. Questions were: do you think your mouth is healthy, do you think you have cavities and do you think you have gum disease? The survey questionnaire was deemed valid through a consensus of experts including a dentist, dental hygienist, rehabilitation researcher, rehabilitation nurse, occupational therapist and a statistician. From the survey, the hypothesis focused on how the SCI individual perceived their own dental health. Answers to each perception question were compared to OHS, DMFT, PSR™ and scores. This indicated the validity of SCI individuals’ perception of oral health compared to dental professionals’ assessments. Since perception is stated as one of the biggest barriers to dental care, such a comparison evaluated an awareness about the need for oral care among the SCI population.32

All data was uploaded into SPSS 16.0 for Windows and carefully examined. Frequencies, crosstabs and chi–squared were used to compare perceived oral status to the dependent variables of OHS, DMFT and PSR™. Records were kept anonymous and confidential.

Results

The study included 92 people with SCIs ages 18 to 71 who sustained their spinal injury a minimum of 6 months prior to appointment (Table I). People with SCIs perceived that their oral health status was better than it actually was (determined from examination scores by dental professional). Of those surveyed, 59% perceived their mouth as healthy. However, according to the actual scores from the OHS index (Table II), only 47.8% were considered good to healthy (a score above 80). Of the 59% who perceived their mouth as healthy, only 36% actually were considered good to healthy. Using a cross tabulation and chi–square to analyze this data revealed that 23% of those who needed dental assistance thought their mouth was already healthy (Figures 1, 2).

<table>
<thead>
<tr>
<th>Descriptive Statistics of PSR</th>
<th>Frequency</th>
<th>%</th>
<th>Valid %</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>Healthy</td>
<td>8</td>
<td>8.7</td>
<td>8.9</td>
</tr>
<tr>
<td></td>
<td>Gingivitis</td>
<td>2</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td>Calculus</td>
<td>11</td>
<td>12.0</td>
<td>12.2</td>
</tr>
<tr>
<td></td>
<td>Shallow pockets</td>
<td>40</td>
<td>43.5</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>Deep pockets</td>
<td>19</td>
<td>20.7</td>
<td>21.1</td>
</tr>
<tr>
<td></td>
<td>Abnormality</td>
<td>6</td>
<td>6.5</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>Not applicable due to dentures</td>
<td>4</td>
<td>4.3</td>
<td>4.4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>97.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Missing System</td>
<td></td>
<td>2</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>92</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table IV: Periodontal Status Determined By Periodontal Screen And Recording Index™ (PSR™) (n=92)

Figure 5: Compares those with SCI that thought they had gum disease to individual categories within the PSR (n=92)
This research has confirmed that people with SCIs need to be made aware of their dental status and educated on habits to promote oral health. Once again, preventive services that are usually provided by a dental hygienist contribute to a decrease in dental disease.

Finally, fewer people with SCIs thought they had gingivitis (“Do you think you have gum disease?”) than the actual PSR™ revealed. Only 16% thought they had gum disease, while over 75% actually had calculus, periodontal disease and/or gingivitis present (Table IV). Approximately 60% of those who thought they had no gum disease were already experiencing periodontal disease (Figures 4, 5).

Discussion

This study provides a snapshot of the oral health status of people with SCIs in Mississippi. In all cases (perception of oral health, cavities and periodontal disease), people with SCIs thought their oral health was better than it was determined to be by a dental professional. One reason that guided this hypothesis was the assumption that people with SCIs may have other priorities than oral health. Indeed, functions endorsed as most relevant to SCI people include regaining arm and hand function, followed by sexual function, then bladder function and finally ability to exercise. Most likely these functions were not met in the majority of our participants, leading to less emphasis on oral health and impaired judgment about seriousness of oral problems.

Little is known of how people actually perceive oral health. Among the general population, those who perceived their oral health as better are younger, more educated, of higher income, partial–less/denture–less, oral pain–free, symptom–free from dental problems and had visited the dental office within the past year. Future studies should include why people with SCIs perceive their oral health as better than it actually is.

Since people with SCIs do perceive their oral health as better than it actually is, health care providers need to do a better job of screening and relaying oral status to this population. Interdisciplinary collaboration must be incorporated. Many nurses, occupational therapists, physical therapists and speech therapists are already screening the oral cavity and giving oral hygiene instructions. Where are the trained dental professionals/hygienists? In Mississippi, dental hygienists are not allowed to perform these duties without the direct supervision of a dentist. When compared to other states, Mississippi has one of the lowest dental hygiene professional practice index scores, which indicates that a revision to the dental hygiene practice statute is necessary to ensure better access to dental care.

Next, fewer people with SCIs thought they had caries (“Do you think you have cavities?”) when compared to the actual decayed portion to the DMFT score (Table III). Only 47% thought they had cavities, whereas 53% actually had decay observed visually without the use of radiographs, concluding that 18% were completely unaware they had clinically visual decay (Figure 3).

Finally, fewer people with SCIs thought they had gingivitis (“Do you think you have gum disease?”) than the actual PSR™ revealed. Only 16% thought they had gum disease, while over 75% actually had calculus, periodontal disease and/or gingivitis present (Table IV). Approximately 60% of those who thought they had no gum disease were already experiencing periodontal disease (Figures 4, 5).

Conclusion

This research has confirmed that people with SCIs need to be made aware of their dental status and educated on habits to promote oral health. Once again, preventive services that are usually provided by a dental hygienist contribute to a decrease in dental disease. Once dental hygienists in this state and all states are allowed to provide services and/or screenings that they are trained to do, it will not be difficult to fight dental disease in people with SCIs.

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References


