Comparison of Treatment Result and Compliance between Private Practice Medicaid and Non-Medicaid Orthodontic Patients – A Brief Communication

Steven Dickens, DDS, MS; Richard A. Beane, DDS; Daniel J. Caplan, DDS, PhD; William Vann, Jr., DMD, MS, PhD

Abstract

Treatment result and compliance for orthodontic Medicaid patients were assessed and compared to non-Medicaid patients of similar initial severity. All 55 North Carolina practices providing orthodontic treatment covered by Medicaid were asked to submit their last five Medicaid cases and five non-Medicaid cases of similar initial treatment complexity. Nine practices agreed to participate. Initial models, final models, and progress notes were obtained for all subjects. Casts were scored using the Peer Assessment Rating (PAR) Index to assess initial and posttreatment orthodontic status, and progress notes were reviewed for compliance data. No clinically important differences were seen between the Medicaid and non-Medicaid groups with respect to initial PAR, final PAR, percent PAR reduction, broken appointments, broken appliances, or poor oral hygiene. In this study, Medicaid and non-Medicaid patients did not differ substantially with respect to effectiveness of treatment received or their compliance with treatment.

Key Words: malocclusion/therapy, Medicaid, orthodontics, patient compliance, private sector, retrospective studies, treatment outcome, United States, North Carolina

Background

It is particularly important for those with few resources to overcome functionally handicapping malocclusions, yet outcomes data on orthodontic care of Medicaid patients are sparse. Submission of posttreatment records is not required by Medicaid in North Carolina (NC). The only record of treatment outcome is a subjective assessment in which the practitioner circles excellent, good, fair, or poor on a posttreatment summary form. No criteria are given for how to assess each case.

The number of orthodontic cases approved by Medicaid in NC has increased from 1,064 in Fiscal Year (FY) 2002 to 5,044 in FY 2005 (personal communication, NC Department of Health and Human Services). With more treatment being rendered, it is important to determine treatment outcomes to assure that Medicaid patients receive a standard of care similar to those not covered by Medicaid.

The dynamics of NC Medicaid coverage are complicated by reimbursement issues. The current NC Medicaid reimbursement rate is slightly over half the national average for complete orthodontic treatment. Practitioners might be tempted to provide substandard care for a substandard fee, but this question has not yet been addressed.

Previous reports from general and pediatric dentistry cite higher rates of broken appointments and poorer compliance as a barrier to caring for Medicaid patients (1-4). The existing orthodontic literature cited Medicaid patients as having more broken appointments (5) and poorer hygiene than orthodontic patients who were not publicly funded (6,7).

If Medicaid patients truly are less compliant, this could dissuade practitioners from providing orthodontic services. This could be a serious concern in NC, where there is a well-documented increase in Medicaid-eligible children but a limited number of practitioners who accept Medicaid-eligible children for orthodontic services. For example, in FY 2003, only 10 orthodontists treated 84 percent of the Medicaid orthodontic cases (8).

The first objective of this study was to examine the treatment result and the amount of improvement orthodontic Medicaid patients made versus non-Medicaid patients with similarly severe malocclusions. Our second goal was to evaluate the compliance factors among Medicaid and non-Medicaid orthodontic patients.

Materials and Methods

This research protocol was approved by the Biomedical Institutional Review Board at the University of North Carolina at Chapel Hill.

Sampling Method. There were 55 private orthodontic practices in NC in FY 2003 approved for orthodontic services covered by Medicaid, all of which were contacted by mail and invited to participate. If no

Send correspondence and reprint requests to Steven Dickens, Department of Orthodontics, CB #7450, Chapel Hill, NC 27599-7450. Tel.: (919) 966-4428; Fax: (919) 843-8864; e-mail: SteveDickens@gmail.com. Steven Dickens and Richard Beane are with the Department of Orthodontics, School of Dentistry, University of North Carolina at Chapel Hill. Daniel J. Caplan is with the Department of Dental Ecology, School of Dentistry, University of North Carolina at Chapel Hill. William Vann, Jr. is with the Department of Pediatric Dentistry, School of Dentistry, University of North Carolina at Chapel Hill. **Sources of Support:** This project was funded by the Department of Orthodontics, School of Dentistry, University of North Carolina at Chapel Hill. Manuscript received: 6/16/06; accepted for publication: 7/15/07.

DOI: 10.1111/j.1752-7325.2007.00059.x

Table 1
Characteristics of Medicaid and Non-Medicaid Patients from Nine Responding Practices

Characteristic	Medicaid ($n = 43$)	Non-Medicaid ($n = 42$)
Mean age at start of treatment	13.6	15.0
Mean treatment time (years)	2.4	2.3
Mean number of appointments	24.2	23.6
Mean initial Peer Assessment Rating (PAR)	33	31
Mean final PAR	4.1	3.6
Mean percent PAR reduction	86	86
Percent of cases: excellent/good/fair	67/26/7	73/22/5
Mean number of broken appointments	1.9	1.9
Percent of cases with greater than three broken appointments	44	45
Mean number of broken appliances	3.6	3.0
Percent of cases with greater than three broken appliances	86	79
Mean number of poor oral hygiene comments	0.9	0.8
Percent of cases with greater than three poor oral hygiene comments	21	24

response was received within 6 weeks, the practitioners were contacted by telephone to determine their willingness to participate. Participation required that each practitioner submit initial and final models for their last five completed Medicaid cases and their last five completed non-Medicaid cases. Medicaid and non-Medicaid cases were matched for similar initial severity. Progress notes were obtained for each case to evaluate patient compliance.

Sample. Nine practices agreed to participate. One practitioner submitted only three cases in each group while another practitioner submitted seven. One practitioner did not have progress notes available for two patients, and another did not have progress notes for three cases.

Data Collection. Protected health information was masked for all cases and each subject was assigned a unique identification number. Because Medicaid in NC reimburses for only one phase of orthodontic treatment during an individual's lifetime, only treatment scheduled to end in the full permanent dentition was examined. All models were from the start and end of this phase of treatment. The start of treatment was defined as the first appointment where fixed orthodontic appliances were bonded. The end of treatment was defined as the appointment where the last fixed orthodontic appliance was removed. All compliance measures were tallied from these two time points.

Severity of malocclusion was scored using the Peer Assessment Rating (PAR) scale (9). All cases were scored by a single examiner (S. D.), and to avoid measurement bias, casts were graded in random order. Initial and final models for 10 cases were randomly selected to assess reliability. Intraclass correlation coefficients showed excellent intra-examiner reliability ($r = 0.98$ and 0.94 for initial and final PAR scores, respectively).

To assess compliance, the number of broken appointments, broken appliances, and poor oral hygiene comments were tallied for each subject. Broken appointments included all appointments canceled <24 hours in advance or for which the patient was >30 minutes late. Broken appliances included any fixed orthodontic attachment noted as loose or completely debonded, broken archwires, or damaged attachments to bonded appliances. Poor oral hygiene comments consisted of any notation of oral hygiene worse than "fair," a grade less than C, or any warning of decalcification or decay if hygiene did not improve.

Initially, we planned to perform statistical analysis to assess the association between Medicaid status and treatment outcomes, adjusting for the effect of office; however, because so few practices chose to participate (9/55), we elected not to perform formal statistical tests, and instead present only descriptive information.

Results

Demographic and treatment data are shown in Table 1. The average age at treatment initiation differed by 1.4 years but the average treatment time and number of appointments differed only slightly between groups. As measured by initial PAR scores, pretreatment severity was similar between groups. No clinically important differences were found in either final PAR scores or percent PAR reduction. Final PAR scores were categorized, with slight modification from Tulloch et al. (10) as follows: excellent = 0 to 4, good = 5 to 9, and fair = ≥10. Though some variation was found between groups, the differences were not substantial. With regard to compliance data, no clinically important differences between Medicaid and non-Medicaid patients were found with respect to broken appointments, broken appliances, or poor oral hygiene comments.

Discussion

Medicaid patients did not differ substantially from non-Medicaid patients with respect to percent PAR reduction or final PAR score. Most cases in both groups finished with an excellent final PAR score. Richmond (9) suggested that >70 percent PAR reduction reflected a case that was greatly improved and the average PAR reduction of 86 percent in our sample greatly exceeded that figure. Only one practice had a PAR reduction below 70 percent and that was in the non-Medicaid group, but this group started with a relatively low initial PAR average, making it difficult to achieve much PAR reduction.

These treatment results compare favorably with those of the two most

notable published studies involving publicly funded orthodontic treatment for indigent populations (6,7). Both reported PAR score improvement similar to what we observed, but the results are not entirely comparable. Different weightings of the PAR scale were used in the study involving First Nations patients in Alberta, Canada (7), and mixed dentition treatment was evaluated in the University of Washington (UW) study (6).

A major limitation of our study is that only nine of the 55 practices treating orthodontic patients covered under Medicaid participated. These nine practices treated only 6 percent of cases (130/2,203) approved by Medicaid in FY 2003. A major factor that restricted our sample size was the requirement that final models be available from each case. Most nonparticipating practitioners cited this as the reason for not participating. It also could be argued that the more conscientious practitioner obtains final models, potentially biasing our sample. Regardless of whether this occurred, we felt the best way to evaluate quality of orthodontic treatment is via pre- and posttreatment records.

Because our response rate was so low, we felt it was inappropriate to perform formal statistical testing, which is conducted under the assumption that data arose from a random sample of practitioners in the target population. While the low response was disappointing and most likely reflects some bias, it was not entirely unexpected and reflects a major barrier to studies of orthodontic treatment outcomes. Still, the data obtained did not reflect important differences in the major orthodontic treatment and compliance outcomes measured in this study, and the data can be used as a starting point or reference for future, adequately powered studies.

One limitation of our patient compliance assessment is that we relied upon chart documentation for compliance data. While one would expect documentation of broken appliances to be valid and reliable, the assessment of broken appointments and oral hygiene might be more subjective. The system used in this study was patterned after those used in comparable investigations (6,7).

One possible explanation for the lack of compliance difference seen in orthodontic patients and those of pediatric and general dentistry practices could be that orthodontic patients are more motivated for the esthetic change resulting from orthodontic treatment than the benefits of general dental services. Our sample was older than the one at UW (6) and our patients may have been more motivated for orthodontic treatment to help social interactions, which are increasingly affected by poor esthetics as adolescents mature. Another possible explanation for the observed similarity in compliance is that there may have been office systems in place in the participating practices that promoted this result. Further research into these systems would be beneficial. Our data reveal that it is possible to deliver a high level of care for orthodontic Medicaid patients without having poor patient compliance levels that have been described in previous studies.

Acknowledgments

We would like to thank Dr. Ceib Phillips and Ms. Debbie Price for their statistical expertise and analysis.

References

1. Lang WP, Weintraub JA. Comparison of Medicaid and non-Medicaid dental providers. J Public Health Dent. 1986; 46(4):207-11.
2. Capilouto E. The dentist's role in access to dental care by Medicaid recipients. J Dent Educ. 1988;52(11):647-52.
3. Damiano PC, Brown ER, Johnson JD, Scheetz JP. Factors affecting dentist participation in a state Medicaid program. J Dent Educ. 1990;54(11):638-43.
4. Venezie RD, Vann WF Jr. Pediatric dentists' participation in the North Carolina Medicaid program. Pediatr Dent. 1993; 15(3):175-81.
5. Horsley BP. Appointment keeping behavior of Medicaid vs. non-Medicaid orthodontic patients [master's thesis]. Richmond (VA): Virginia Commonwealth University; 2004.
6. Mirabelli JT, Huang GJ, Siun CH, King GJ, Omnell L. The effectiveness of phase I orthodontic treatment in a Medicaid population. Am J Orthod Dentofacial Orthop. 2005;127(5):592-8.
7. Cadman KC, Glover KE, Heo G, Warren S, Major PW. Orthodontic treatment outcome in a First Nations population in Alberta, Canada: a comparative study. Am J Orthod Dentofacial Orthop. 2002; 121(4):396-402.
8. Im JL. The North Carolina Medicaid program: participation and perceptions among practicing orthodontists [master's thesis]. Chapel Hill (NC): University of North Carolina at Chapel Hill; 2006.
9. Richmond S, Shaw WC, Roberts CT, Andrews M. The PAR index (peer assessment rating): Methods to determine outcome of orthodontic treatment in terms of improvement and standards. Eur J Orthod. 1992;14:180-7.
10. Tulloch JFC, Phillips C, Proffit WR. Benefit of early Class II treatment: progress report of a two-phase randomized clinical trial. Am J Orthod Dentofacial Orthop. 1998;113(1):62-72.