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[Athletic Training]

Patient Throughput in a Sports Medicine Clinic With the Implementation of an Athletic Trainer: A Retrospective Analysis

Timothy S. Nicolello, MS, ATC, LAT, OTC,*† Forrest Q. Pecha, MS, ATC, LAT, OTC, CSCS,† Reed L. Omdal, MS, ATC, LAT, OTC,† Kurt J. Nilsson, MD, MS,† and Alejandro A. Homaechevarria, MD†

Background: Orthopaedic clinics have acquired a multitude of health professionals to improve clinic efficiency. More recently, athletic trainers (ATs) have been utilized to improve clinical efficiency and patient care because of their extensive background in musculoskeletal injuries and anatomy. Improved clinical efficiency allows for increased patient visits, potentially enhancing patient access and downstream revenue via relative value units (RVUs).

Hypothesis: The addition of an AT into a sports medicine physician's clinic will increase total patient throughput and overall RVU production.

Study Design: Retrospective analysis.

Level of Evidence: Level 4.

Methods: Patients seen by each of the 2 primary care sports medicine physicians at St Luke's Sports Medicine for a 2-year period were retrospectively evaluated. The initial clinic model included the physician and a medical assistant; during the second year of analysis an AT was added to the clinic staffing model. Two-tailed *t* tests were used to determine significant differences in patient volume between the 2 periods of data collection.

Results: Through the implementation of an AT, patient throughput increased by 0.7 patients per hour over 2 half-day clinics, a 25% increase ($P < 0.01$). Physician B patient visits increased by 21%, or 3.8 patients per 6.5-hour clinic day ($P < 0.01$). Additionally, RVU production increased by 3.23 per half-day and 4.3 per full day for physicians A and B, respectively.

Conclusion: Clinical efficiency was improved with the addition of an AT. Total physician RVUs improved, thereby raising the potential revenue of both the physician and health care institution. Employing ATs in a sports medicine clinic may improve clinical productivity and financial stability, thereby validating the incorporation of ATs into the established clinical model.

Clinical Relevance: Limited research exists measuring patient throughput with an AT in a sports medicine clinic. This study investigates patient throughput and the subsequent increase in work-based RVUs.

Keywords: relative value unit; clinical efficiency; clinical revenue; health care institution; orthopaedic practice

As recent changes in health care have placed an emphasis on increased patient visits in the ambulatory setting, orthopaedic clinics have acquired a multitude of health professionals to improve clinic efficiency and patient care. The varying backgrounds of these clinicians have expanded to include advance practice nurses, physician assistants, medical assistants, and, more recently, athletic trainers (ATs). Given the education and clinical abilities of ATs, many orthopaedic physicians frequently utilize their skills in their daily clinical models.[8] ATs are educated in comprehensive health care services, to include 6 domains of clinical practice: prevention; clinical evaluation and diagnosis; immediate care; treatment,

From †St Luke's Sports Medicine, Boise, Idaho
*Address correspondence to Timothy S. Nicolello, MS, ATC, LAT, OTC, St Luke's Sports Medicine, 1109 West Myrtle Street, Suite 200, Boise, ID, 83702, USA (email: tnicolello@slhs.org).
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rehabilitation, and reconditioning; organization and administration; and professional responsibility using a medical-based education model. When utilized correctly, ATs are able to assist the physician with rooming patients, documentation, collection of history of present illness, initial physical examinations, patient education, preparing injections, preparing patients, assisting with procedures, and documentation of electronic medical records. Additionally, ATs are trained to educate patients on preoperative, postoperative, and nonoperative treatment plans. This includes appropriate postoperative care, on-site rehabilitation, and development of home exercise programs, all of which provide physicians with more time to spend with patients.[3] This has subsequently resulted in greater clinical productivity and increased practice revenue.[8] Furthermore, patients view ATs as positive and personable health care providers within the clinical setting. In a survey of patient perceptions of ATs, ATs had an average of 9.1 out of 10 (0-10) Likert-type scale rating in overall satisfaction during their visit in the orthopaedic clinic.[6] An additional study investigated patient-perceived satisfaction with regard to level of care and education of ATs and medical residents. When blinded to their initial health care provider, patients perceived ATs as similar to orthopaedic medical residents in terms of quality of care given and perceived level of musculoskeletal knowledge.[6]

Recently, there has been an increase in literature regarding the benefits of ATs utilized within an orthopaedic practice when compared with other types of health care clinicians. Recent research has shown that an AT in the physician clinic practice can improve clinic productivity and patient throughput when compared with a medical assistant (MA) when evaluating encounters, collections, and billed charges. The addition of an AT to the orthopaedic clinic model resulted in a 22% increase in patient encounters per day, and a correlated 60% increase per day in calculated collections than the previous physician-MA model.[7] Other research investigating improvement in clinical efficiency with an AT found between 15% and 30% increases in daily patient throughput.[4]

As provision and reimbursement for health care services evolve, physicians and health care institutions are incentivized to streamline office efficiency and search for new revenue streams to meet the growing demand on the health care system.[4] Increasing clinical efficiency subsequently allows for increased patient throughput, which inevitably increases clinical revenue from patient visits and surgical cases. Using 2012 Medicare fees and Current Procedural Terminology (CPT) coding, with an assumption of a 1:4 ratio of new patient to follow-up visits, each additional evaluation and management (E/M) service equates to $88.21 per patient in Medicare dollars. Therefore, an additional patient per day per provider in a 3-day clinic week results in an annual increase of $12,702.24.[4] Increased patient volume can also increase relative value units (RVUs). RVUs are a measure of the amount of resources that a physician consumes during practice, and have become the standard measurement for cost benchmarking. They place value based on specific types of health care services, calculated to provide a monetary amount in which a physician is reimbursed by Centers for Medicare and Medicaid Services (CMS) and/or private insurance payers for their services. RVUs are separated in to 3 categories: work (wRVU), practice expense (peRVU), and malpractice (mRVU). wRVU is composed of time and effort, accounting for 70% and 30%, respectively. Patients requiring specialized physician care are assigned a wRVU based on the services provided by the health care professional. Increased RVUs and subsequent physician and institution revenue in clinics utilizing ATs can provide validity to the efficacy of the specific orthopaedic clinical model.[2]

The purpose of this study is to retrospectively analyze total patient throughput, subsequent clinical reimbursement, and RVU production in 2 orthopaedic sports medicine physicians' clinics during a 2-year span with and without the addition of an AT to the staffing model.

METHODS

This research was approved by the St Luke's Institutional Review Board. Patients scheduled and seen by the 2 primary care sports medicine physicians at St Luke's Sports Medicine were retrospectively evaluated. Patient visits were tracked and categorized based on the nature of the encounter using NextGen (Horsham) and Athena (athenahealth) scheduling software. All types of appointments were included in the analysis, characterized as "new patient visit" (NPV), "established new patient visit" (EPV), and "follow-up" (FU) appointments. An NPV was defined as a patient who had never sought care from the participating physician's clinic to which the patient is presenting. EPV patients were those who had been seen by the same physician specialty within the physician network, but for a separate injury or condition. NPV and EPV patients were categorized in an effort to distinguish if any increase in patient throughput was a true reflection of clinical efficiency. Retrospectively, NPV and EPV patients comprised 43% and 47% of overall patient visits between year 1 and year 2, respectively, for physician A, and 41% and 40% of physician B visits. It was found that the ratio of NPV/EPV visits to total patient visits did not change significantly ($P > 0.05$). Therefore, to ensure consistent wRVU classification, all new and established patients were analyzed as an E/M level of service (LOS) of 3, assigning 99203/99213 CPT codes after reviewing patient visits.

During the first year of collection, the clinic model included solely the orthopaedic physician and an MA, and during the second year the clinic model was expanded to include the physician, MA, and the addition of an AT with more than 10 years' experience implementing and directing AT residency programs. The physicians' clinics varied relative to patient volume and were standardized according to patients per hour (physician A) and patients per day (physician B), given the variability in clinic hours per day for physician A. Expected clinic values were calculated using a standard RVU calculation,[5] established CMS Medicare rates for physician reimbursement, and using each respective physician's NPV/EPV to total patient

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Table 1. Patient visits in physician A clinic with and without an AT

Year 1	No. of patients	No. of days	pts/day	pts/h	Year 2	No. of patients	No. of days	pts/day	pts/h
Without AT	908	83	10.9	2.8	With AT	786	57	13.8	3.45

AT, athletic trainer; pts, patients

Table 2. Patient visits in physician B clinic with and without an AT

Year 1	No. of patients	No. of weeks	pts/day	Year 2	No. of patients	No. of weeks	pts/day
Without AT	1134	61	18.6	With AT	651	29	22.5

AT, athletic trainer; pts, patients

ratio. Two-tailed *t* tests were utilized to determine statistical significance.

RESULTS

Two primary care sports medicine clinics were utilized. The patient throughput was calculated with respect to the total physician hours in clinic per day; physician A was measured at 4 hours per half clinic day and physician B was measured at 6.5 hours per full clinic day.

Over the course of retrospective data analysis, the addition of an AT to the existing clinical model was shown to improve total patient volume from 2514 to 3305 patients. Normalized to per-hour rates, physician A experienced an increase from 2.8 patients per hour in year 1 to 3.5 patients per hour in year 2. This equates to 0.7 additional patients per hour, or 5.6 patients per day over a 6.5-hour clinic day, a 25% increase ($P < 0.01$) (Table 1).

Physician B experienced a total increase in patients per day from 18.6 to 22.5 patients per clinic day utilizing an AT (Table 2). Similarly, physician B saw an improved rate from 2.9 patients per hour in year 1 to 3.5 patients per hour in year 2, an increase of 21% in overall patient visits ($P < 0.01$).

Increases in efficiency did not change the proportions of NPV and EPV visits to overall patient visits, as NPV and EPV encounters accounted for 40% to 47% of total visits across the data collection period. Physician A experienced a minimal increase in NPV and EPV visits relative to overall patient encounters between year 1 and year 2 (43% and 47%, respectively), while physician B saw a slight decrease in NPV/EPV ratio from 41% in year 1 to 40% in year 2. The changes in NPV and EPV ratios were not found to be significant. Overall, both physician A and physician B were able to see more patients per clinic day, but the clinical requirements of the increased patient visits had no effect on overall time spent in clinic by the providers.

RVU values were calculated using a standard Medicare conversion factor. New patient LOS wRVU values ranged from 0.93 to 2.43, while EPV wRVU values ranged from 0.48 to 0.50. Ultrasound guidance for specific procedures, particularly large joint aspirations/injections, increased wRVU from 0.79 to 1.10. These values were factored into total NPV and EPV calculations, providing an overall estimate of wRVU relative to the staffing model implemented by the clinic at the time of service. Related to patient LOS, total RVU production was increased by 3.23 per half day for physician A and 4.3 for full clinic day for physician B (Figure 1).

DISCUSSION

This study provides detailed analysis of patient throughput in clinics employing ATs relative to the traditional physician-MA model. Physicians utilizing ATs for patient documentation, injury assessment and evaluation, physician-directed diagnostic orders, assisting with procedures, and patient education were able to increase patient load when measured by overall visits, visits per hour, and patients per day. Additionally, the percentage of new encounters relative to overall visits remained unchanged in clinics employing an AT.

These findings are consistent with other literature supporting the role of ATs in the clinical setting. The time saved by the ATs has led to increases in quality time spent by the physician with the patient, increased patient satisfaction, and improved professional and personal satisfaction of physicians.[7] Additionally, in a randomized, double-blinded study, no statistical difference was found between orthopaedic medical residents and ATs in patient perception related to orthopaedic knowledge, suggesting that the ATs effectively utilize their musculoskeletal background in the clinical setting.[6]

The monetary value of ATs is an important consideration in the development of a clinical environment. RVUs are assigned to each encounter with a physician relative to the services

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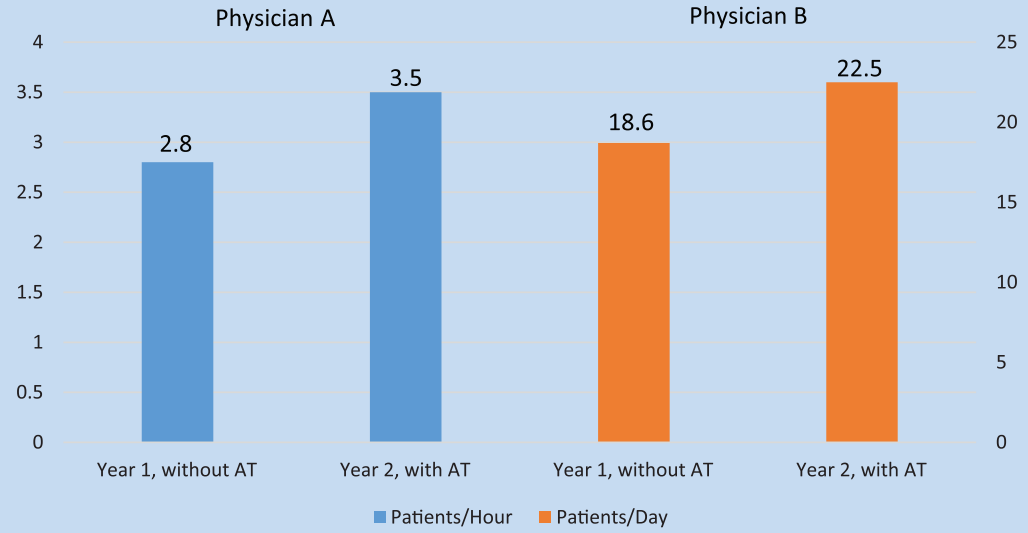

Figure 1. Patient throughput over a 2-year period with and without an athletic trainer (AT).

provided, with new patients assigned a higher monetary amount given the length of time typically associated with initial visits. In this study, both sports medicine physicians were able to increase their patient volumes by more than 20% in 1 calendar year with the addition of an AT, therefore generating previously unseen additional clinic revenue. Both providers were also able to maintain a consistent percentage of new and established patients (43%-47%) with and without an AT, ensuring that increased patient throughput was not due to changes in E/M visit proportions. Additionally, physician B was able to perform more diagnostic ultrasound procedural visits with an AT given the improved clinical efficiency, thereby generating additional value relative to the previous model. In this study, all new and established patients were assigned either a 99203 or 99213 code for LOS in order to ensure consistent classification and to simplify analysis. Using this method most likely underestimates the RVU values for patient visits, as level 4 patient encounters outnumber level 2 visits in primary care sports medicine clinics.

The increase in reimbursement rates for the clinic allows for increased revenue for the hospital network and satisfies the accountable health care model of seeing an increased ratio of patients in the ambulatory setting. The improvements in patient throughput and revenue also provide rationalization for employing ATs and enable clinics to quantify the monetary value of ATs to a sports medicine practice. There has been limited research related to the value of ATs given the limited ability to bill for services provided solely byATs, but the documentation of patient throughput, clinical reimbursement, and RVU data enable the calculation of AT efficiency and gives credence to the well-rounded clinical ability of ATs. A 22% increase in patient throughput related to the AT would potentially create up to 1014 additional E/M visits per year, based on six 4-hour clinical sessions. Using an average, the established rate of $88.21 per E/M visit would equate to $89,423.77 in potential revenue from visits alone, not including surgical services provided. Using a surgical conversion rate of 16.70% established by the 2012 Medical Group Management Association Academic Practice Compensation and Production Survey for Faculty and Management, an increase in 2 patients per hour could result in as much as $122,996.83 annually in downstream ancillaries (E/M visits, ancillaries, and surgeries) over the course of six 4-hour clinic sessions.[4]

Incorporating an additional clinical staff member to a physician clinic would require additional salary and benefit costs, but the return on investment for ATs in the physician practice setting is beneficial for the orthopaedic practice. According to the 2014 National Athletic Trainers' Association salary survey, the average salary of a clinical AT is $52,516 per year, plus additional benefit and retirement contributions.[1] Measuring clinical productivity improvements related to AT services highlights the potential revenue return on investment that a physician clinic can acquire with the employment of ATs in their practice.

Limitations of the study include variability of physician schedules. Patient visits were analyzed according to the physician schedules; subsequently, the patient groups were separated according to clinic. Physician A's clinical start time varied depending on day; therefore, patient rates were calculated per hour rather than per day. Additionally, after hiring a clinical AT, data were not collected for the first 3 months to allow for full implementation into the physician's procedures and clinic flow.

The patient perception of ATs as knowledgeable, helpful, personable caregivers demonstrates the ability of ATs to adapt to various patient populations and demographics outside the traditional interscholastic or professional sports settings. This study includes increased clinical productivity to the already-established

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benefits of incorporating athletic trainers into the physician practice setting, showing that ATs were able to increase patient throughput by 21% to 25% for 2 separate physician clinics. As health care continues to emphasize the importance of primary care providers in the orthopaedic setting, ATs have been established as effective clinicians, a measurable return on investment, and valuable assets overall to the clinical setting.

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