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Educating Reimbursement Specialists About Plagiocephaly: Improving Efficiency of the Prior Authorization Process for Providers, Healthcare Staff, and Patients

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EDUCATING REIMBURSEMENT SPECIALISTS ABOUT PLAGIOCEPHALY: IMPROVING EFFICIENCY OF THE PRIOR AUTHORIZATION PROCESS FOR PROVIDERS, HEALTHCARE STAFF, AND PATIENTS

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This is to certify that I have examined this
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Abstract

Deformational plagiocephaly (DP) is a condition in which an infant's head becomes deformed and flattened because of molding forces that manipulate the malleable cranium. DP is very common, impacting an estimated 46% of infants within the United States. The resulting asymmetries of the head and face carry implications for functional, social, and emotional interactions. Helmet therapy is the recommended treatment for persistent moderate-to-severe plagiocephaly. It is most effective when started before six months of life with decreasing correction as the child nears one year old. Helmet therapy is very effective but is also expensive, and insurers have highly variable policies such as prior authorizations (PA) for reimbursement. The PA process is lengthy and requires substantial administrative and clinical effort from craniofacial advanced practice providers, including nurse practitioners and physician assistants. Insurers frequently require a peer-to-peer discussion, which is a conversation between the craniofacial provider and an insurer-designated medical provider to discuss reasoning behind the clinical recommendation. This is very time consuming and presents a significant administrative burden for the craniofacial provider. The process delays the initiation of helmet therapy, which may negatively impact patient outcomes. This quality improvement project, aimed at improving the prior authorization process, occurred over eight months within a mid-size pediatric orthotics group located in a large urban area in the Midwest. It included the creation and integration of a written brochure tool that was utilized in the PA process. Craniofacial providers and staff completed a pre-and-post-implementation survey assessing their perceptions of the tool's impact. Additionally, data on insurer communications and outcomes were obtained before and after the tool's implementation. Results indicate that the educational brochure (1) significantly improved response times from many insurers, thus improving access to helmet therapy for patients, (2) decreased the number of peer-to-peer requests, thereby decreasing the administrative load for the craniofacial provider and expediting access to therapy for patients and (3) ultimately was correlated with increased prior authorization approval. Although these results are limited by several variables, they demonstrate that proactive insurer outreach resulted in significant improvements in PA timeliness and administrative burden. For similar insurer-mediated delays, results suggest that it may be beneficial to facilitate proactive outreach to insurers.

Introduction

Because of the high infant mortality rate associated with sudden infant death syndrome, the American Academy of Pediatrics' created the "Back to Sleep" campaign in 1994, which encouraged supine positioning to combat sudden infant death syndrome (SIDS). This campaign was very successful and resulted in a significant decrease in SIDS events within the US, but it also resulted in rapid increases in the rates of positional head deformities such as deformational plagiocephaly (DP) (Graham et al., 2020, van Vlimmeren et al, 2005, & Watt et al., 2021). DP is a condition in which an infant's head becomes deformed and flattened because of prenatal and postnatal external molding forces that manipulate the malleable cranium (Tamber et al., 2016 & van Vlimmeren et al., 2005). The resulting asymmetries may have substantial impacts on people's functional and psychosocial health (Kluba et al., 2016; Wang et al., 2017; Williams et al., 2013).

The treatment of choice for persistent moderate and severe DP is helmet therapy (Kato et al., 2022; Kunz et al., 2019; Noto et al., 2021; Takamatsu et al., 2021; Wen et al., 2020). It is most effective if initiated before six months, with decreasing efficacy as the child nears one year of life (Watt et al., 2022). Helmet therapy is very effective but is also expensive, and insurers have highly variable policies for reimbursement (Kato et al., 2022). As a result, the prior authorization (PA) process is often lengthy and requires substantial time and effort from the craniofacial team to access reimbursement. The process frequently involves a time-intensive peer-to-peer discussion, which includes a review of the current plagiocephaly evaluation process and recommendation. Even with the review, insurers may not pay for helmet treatment or may only cover a fraction of the cost, which is emotionally and fiscally stressful for families.

Additionally, the delays of insurer communications results in later initiation of helmet therapy, which negatively impacts outcomes.

This quality improvement project, aimed at improving the prior authorization process, took place in a mid-size pediatric orthotics group located in a large urban area in the Midwest. The project included the creation of a document that was integrated in each PA request. The document highlighted the general process at the organization of evaluation, treatment, and if indicated, the prescription of helmet therapy. It also highlighted the challenges with over-reliance on 2-dimensional measurements for the determination of care and emphasized the importance of timeliness in helmet initiation and its impact on outcomes. A pre-and-post-implementation questionnaire was distributed to craniofacial staff to explore current perceptions of the helmet reimbursement process and to determine the perceived impact on PA outcomes, provider and craniofacial staff's labor, timeliness of insurer response, and overall patient experience. Additionally, deidentified data on insurer communications and financial outcomes were obtained during the pre-and-post-implementation time periods. The purpose of this intervention was to utilize proactive outreach to insurers to decrease the labor burden of the PA process for craniofacial advanced practice providers and to improve the perceived experience for infants and their families. The findings indicate that it was effective in this aim. Results demonstrate that the intervention (1) significantly improved insurer response time, (2) decreased the number of peer-to-peer discussions requested, and (3) appears to have been associated with increased PA approvals. Additionally, staff perceived the project significantly decreased their time and effort for the PA process and improved patients and family experiences. These results suggest that proactive outreach to insurers may result in decreased administrative burden and improved access to timely care for patients.

Background

Plagiocephaly Physical Impacts

Deformational plagiocephaly (DP) is primarily a cosmetic issue, although it does have social and functional implications (Graham et al., 2020). It does not result from early suture closure as in craniosynostosis, and it appears to have no impact on brain growth or function (Tamber et al., 2016). However, it is associated with several other craniofacial asymmetries including facial asymmetry, mandibular asymmetry, and visual asymmetries (Kato et al., 2022; Kluba et al., 2016; Kreutz et al., 2018; Moon et al., 2014; Visse et al., 2020). Abnormal head shapes with resulting ear shift or facial asymmetries may cause difficulty with the appropriate fit of glasses and helmets if unresolved later in life (Graham et al., 2020). Additionally, untreated deformational plagiocephaly has been associated with zygomatic asymmetry, mandibular deformity, and occlusion differences due to facial bone changes following skull base molding and deformation (Baumler et al., 2007; Kluba et al., 2016; Moon et al., 2014). Mandibular differences provide functional challenges with orthodontia but also have been connected to physical attraction (Kluba et al., 2016; Williams et al., 2013). These facial asymmetries associated with plagiocephaly have the potential to significantly impact physical function.

Social and Emotional Impacts

Children with persistent plagiocephaly may endure the socioemotional impacts of lasting facial and cranial asymmetries associated with untreated plagiocephaly throughout their lifespan (Graham et al., 2020). Plagiocephaly results in asymmetries of the brow, occiput, zygomatic changes, and nose, which is associated with increased social judgement and individual discontent (Moon et al., 2014; Wang et al., 2017. Brow asymmetry of 3.5 mm or more is noticeably asymmetrical by observers, which is particularly significant in the context of brow asymmetry

associated with DP (Wang et al., 2017). Additionally, the nose is particularly central to the face; its asymmetry is notable at a 4 mm perceptive threshold (Wang et al., 2017). Given the face is the focal point of human interaction, asymmetries are particularly impactful on self-esteem and social interaction (Wang et al., 2017).

As a result of its particularly visible nature, deformational plagiocephaly is associated with lower infant and parent quality of life (Ryall et al., 2019). Plagiocephaly is correlated with lower scores in physical functioning, general health perception, and higher parental emotional distress (Ryall et al., 2019). Its easy recognition in its moderate and severe forms by the public is often of significant concern to families (Vu et al., 2020). Some patients with persistent head shape differences later in life may experience lower self-esteem and increased bullying or social conflict due to persistent cranial asymmetry (Graham et al., 2020; Little et al., 2011; Wang et al., 2017). In addition to interpersonal interactions, facial symmetry is correlated with increased economic upward mobility, especially for women, and increased success with romantic relationships (Little et al., 2011). Overall, plagiocephaly's central and highly visible nature has significant psychosocial impacts on children and their families; this should be considered when offering treatment.

Treatment Options

The current standards of treatment for DP include repositioning efforts and cranial remodeling orthoses, also known as helmet therapy, as shown in Appendix A (Kato et al., 2022; Lipira et al., 2010). Repositioning aims to displace pressure from the area of flatness and thus improve head shape (Lipira et al., 2010). Conversely, helmet therapy applies gentle pressure to areas of bossing and guides growth into areas of flatness (Lipira et al., 2010).

Helmet Therapy

Helmet therapy is a topic of active research, with most literature demonstrating superior correction of asymmetry with the use of helmet therapy for infants with moderate and severe plagiocephaly compared to repositioning (Kato et al., 2022; Kluba et al., 2014; Kunz et al., 2019; Noto et al., 2021; Takamatsu et al., 2021; Wen et al., 2020**).** It is recommended that helmet therapy begins between four and nine months of age during the time of fastest head growth, with recent studies demonstrating improved corrective ability if started before six months of age (Jung & Yun, 2020; Watt et al., 2022). Helmet therapy is correlated with improvement of facial asymmetry and improved quality of life and is widely considered to be a very effective method of correction for cranial asymmetries (Kreutz et al., 2018; Kunz et al., 2019; Picart et al., 2020; Ryall et al., 2021; Viese et al., 2020). Contrary to the majority opinion, several studies have contested this understanding, finding only a minimal difference in improvement between helmet therapy and repositioning efforts, even with severe cases (Gonzalez-Santos et al., 2020; Loveday et al., 2001; Van Wijk et al., 2014**).** Nonetheless, helmet therapy remains an accepted and commonly utilized therapy for persistent plagiocephaly, with a recent consensus statement from the Congress of Neurological Surgeons recommending its utilization for moderate and severe plagiocephaly (Tamber et al., 2016).

Evaluation of Plagiocephaly

The experienced craniofacial medical provider evaluates plagiocephaly through both observation and objective measurement (Jung & Yun, 2020; Lipira et al., 2010; van Vlimmeren et al., 2005). There are a variety of methods for measurement of asymmetry that have varying levels of both accuracy and comprehensive evaluative abilities including computed tomography, laser scans, calipers, flexible molding bands, or indirect methods such as photogrammetry (Skolnick et al., 2015; Tamber et al., 2016). While 3-dimensional measurements such as

computed tomography, laser therapy, and photogrammetry are widely considered the most accurate, the most common evaluation method uses calipers to measure asymmetries of the cranium (Tamber et al., 2016; Jung & Yun, 2020).

There are both manual and digital calipers available, which are used to measure the differences between diagonal lengths of the head as demonstrated in Appendix B (Jung & Yun, 2020). Calipers use a ruler-like appliance with millimeter are used to measure cranial vault asymmetry (CVA), or the difference between two diagonals of the head (Jung & Yun, 2020). CVA carries with it several concerning factors including questionable inter and intra-rater reliability and its definition as a 2-dimensional classification of a 3-dimensional deformity (Plank et al., 2006; Mortenson et al., 2006; Kato et al., 2022; Lipira et al., 2010; Pastor-Pons et al., 2020; Visse et al., 2020). It fails to capture facial asymmetries and displacement of head volume into the parietal and lower occipital areas (Atmosukarto et al., 2010; Kato et al., 2022; Visse et al., 2020). Still, both digital and manual caliper-based CVA measurements continue to be widely used in plagiocephaly centers across the world and are relied on for the determination of insurance coverage of helmet therapy in the United States (Pastor-Pons et al., 2020).

Timeliness of Helmet Therapy

A wealth of literature demonstrates that early initiation of helmet therapy among infants younger than six months of age is associated with increased correction and shorter treatment times compared to older infants (Watt et al., 2022). Consequently, delays in access to therapy have been associated with decreased efficacy and increased duration of treatment (Watt et al., 2022). This carries significant implications for caregiver stress, patient results, and healthcare costs (Watt et al., 2022). Additionally, earlier diagnosis and treatment has been proposed to be associated with lower total costs for care (Watt et al., 2022). One model suggests that early

diagnosis and treatment of plagiocephaly at four months may lead to costs of around $1495 compared to a diagnosis for an infant older than six months, which may lead to approximately $5195 in total treatment costs (Watt et al., 2022). Overall, delays in treatment have negative outcomes for patients in regards to correction, emotional impact, and cost.

Reimbursement Challenges

Unfortunately, insurance coverage of helmet therapy is highly variable within the United States, as some companies consider the issue purely cosmetic and use contesting data to suggest that there is minimal difference between repositioning and helmet therapy outcomes (Lipira et al., 2010). Insurance companies may provide incomplete coverage or may refuse entirely to provide compensation for helmet therapy (Graham et al., 2019; Junn et al., 2021).

Among insurers who provide restricted coverage, CVA measurements are utilized to determine medical necessity; unfortunately, this may be problematic given the nature of the 2-dimensional measurement and its variable reliability due to variances in measurement (Kato et al., 2022; Lipira et al., 2010; Skolnick et al., 2015). Conversely, other methods such as photogrammetry and 3-dimensional laser scans, which do provide a low-cost multidimensional image of the deformity, can be used to determine a wide range of measurements and skull volumes (Atmosukarto et al., 2010; Dorhage et al., 2018; Tamber et al., 2016). These measurements, however, are difficult for insurers to standardize for use in the determination of reimbursement (Atmosukarto et al., 2010; Dorhage et al., 2018; Tamber et al., 2016).

Insurance barriers are common causes of delays in presentation for evaluation and treatment of plagiocephaly and may eliminate access for children with highly restrictive insurance coverage (Junn et al., 2021). In a retrospective review published in 2021, researchers concluded that children with Medicaid insurance were 1.3 times more likely to have delayed

presentation for plagiocephaly evaluation and those from the lowest income quartile were between 1.58 times more likely to have a delayed presentation relative to children from different socioeconomic backgrounds (Junn et al., 2021). Because Medicaid coverage is state-dependent, there is no consistent measurement that dictates coverage. For example, a review of the Oklahoma Medicaid policy reveals a requirement of 10 mm of documented asymmetry, referred to as "severe" in conjunction with the failure of conservative management to qualify for cranial remodeling orthosis coverage (Oklahoma Healthcare Authority, 2020). Conversely, states like Minnesota Medicaid have more liberal policies that cover all deformational plagiocephaly that is associated with "Back to Sleep" sleeping positions and torticollis (Minnesota Department of Human Services, 2022). These discrepancies in coverage further limit access to helmet therapy for those from lower income brackets (Graham Jr. et al., 2019).

Unfortunately, many other community insurance companies are increasingly restrictive of coverage as well. For example, Molina Healthcare lists many requirements to access coverage including documented failure of 2-3 months of conservative measures, documented severe asymmetry (CVA) of "> 10-12 mm", photograph of deformity, and documentation of family education of repositioning techniques to access reimbursement (Molina Healthcare, 2020). This large number of restricting qualifications are used to limit coverage for children, causing undue financial and emotional duress for families and often delays in care.

Similarly, children with CVA measurements that border the insurer requirement may experience insurance resistance or denials, even if their asymmetry is persistent and significant despite repositioning (S. King, personal communication, September 2022). This is concerning given the variability involved in caliper-based measurements and the inability of CVA to quantify certain craniofacial and occipitoparietal asymmetries (Plank et al., 2006; Mortenson et

al., 2006; Kato et al., 2022; Lipira et al., 2010; Pastor-Pons et al., 2020; Visse et al., 2020). As a result, many families of children with significant DP are faced with the decision to either pay out-of-pocket or forgo therapy if coverage is denied.

Nursing aims to advocate for equitable access to care to optimize holistic health (Flaubert et al., 2021). As nurses, restrictive healthcare access that disproportionately impacts children with lower socioeconomic means should be of high importance. As leaders within the nursing field, it is important for APPs to use their skill and knowledge to advocate for equitable access to orthotic care.

Organizational Context

The orthotics group partnered with for this project is a pediatric orthotics organization that serves children within a large metropolitan area. Approximately 50% of their total orthotics are comprised of cranial remodeling orthoses (S. Stackhouse, personal communication, August, 2022). They work collaboratively with a local children's hospital to provide custom-made helmet therapy for infants with moderate-to-severe plagiocephaly. Currently, approximately 10.5% of that population faces barriers from insurance companies for reimbursement of helmet therapy (S. Stackhouse, personal communication, August 2022). This is especially significant as it bestows significant emotional and financial distress on families who may have to decide whether they will pay out-of-pocket for therapy or not proceed with helmet therapy. The average out-of-pocket cost for helmet therapy as of August 2022 is $2851, which presents a significant financial burden to families (S. Stackhouse, personal communication, August, 2022).

In addition to cost, insurer communications frequently result in delays in access to care. Within the organization's plagiocephaly patient population, delays in care due to insurer communications contribute to later therapy initiation for patients. Helmet fabrication is not

initiated until insurance and financial outcomes have been determined, which can result in weeks of delay prior to helmet initiation for patients.

The current plagiocephaly evaluation begins with a referral from the primary care provider (PCP) for infants with concern for plagiocephaly to the craniofacial program at the local children's hospital. Once referred, the infant is seen in conjunction with a craniofacial advanced practice provider (APP), certified orthotist, and physical therapist (S. Stackhouse, personal communication, August, 2022). The team discusses parental concerns and history of head shape, current conservative measures, concerns for neck rotation, comorbidities, and birth history. They evaluate the physical exam of the infant, perform a focused neck evaluation, and obtain objective measures of the cranium utilizing digital calipers.

If the family reports two months of attempts of conservative measures such as repositioning and increased prone positioning or the infant is severely affected, helmet therapy is introduced as an option (K. Kemper, personal communication, September, 2022). Currently, a CVA of 8 mm or higher is referred for helmet therapy (K. Kemper, personal communication, September, 2022). Infants with greater asymmetry than represented in measurement or strong family concern for aesthetic appearance are referred for helmet therapy (K. Kemper, personal communication, September, 2022). A helmet model is shown to the family, and the risks and benefits of helmeting are discussed. If the family would like to proceed, a free laser scan is obtained by the pediatric certified orthotist to create the 3-dimensional model utilized to craft a custom cranial remodeling orthosis (S. Stackhouse, personal communication, August, 2022).

At that point, patient care coordinators, who are located in the orthotics offices and assist with the plagiocephaly process, begin the discussion of financial coverage with insurance companies. They submit a request including anthropomorphic measurement, screenshot of the 3-

dimensional laser scan, and a log of documented “tummy time” to demonstrate asymmetry and exhaustion of conservative measures to insurers (S. Stackhouse, personal communication, August, 2022). Many insurance companies require certain degrees of asymmetry to qualify for reimbursement or require a pre-authorization request to be submitted while some others approve helmet therapy regardless of the child’s degree of asymmetry. Each insurer’s coverage of helmet therapy is highly variable, and many use different parameters to determine reimbursement.

Insurance coverage for helmet therapy varies accordingly with asymmetries as mild as 6 mm covered by some insurance companies or requirements of greater than 12 mm of asymmetry for others (S. King, personal communication, August, 2022. If denied coverage, the orthotics group will resubmit for an appeal and insurers may initiate a peer-to-peer review with the craniofacial advanced practice provider and an insurer-employed practitioner to discuss indications for helmeting (S. King, personal communication, August, 2022). This process can take several weeks to over a month to complete, which means many patients experience delays in wear until the financial process is resolved (S. Stackhouse, personal communication, November, 2022).

After discussing the process with the primary craniofacial APPs who work with the hospital plagiocephaly program, there were several areas of frustration within the prior authorization and peer-to-peer process that were identified. Of note, there are only two advanced practice providers (APPs) who work within the craniofacial plagiocephaly program, and both were interviewed as part of the planning process. According to the APPs, the prior authorization process is very time consuming and frustrating, with frequent issues with scheduling peer-to-peer discussions and substantial time burden allocated to the process (K. Kemper, personal communication, September 2022).

Currently, the craniofacial APP provides approximately three peer-to-peer discussions per month (K. Kemper, personal communication, September, 2022). Each discussion requires preparation and logistical coordination to be performed by the craniofacial provider leading up to the meeting (K. Kemper, personal communication, September, 2022). Although the orthotics company does submit the initial prior authorization request, the APP must coordinate scheduling of the peer-to-peer discussion and must prepare for the visit through review of clinical history, acquiring 3-dimensional laser scan, and preparation of evidence supporting decision (K. Kemper, personal communication, September, 2022). On average, the current peer-to-peer discussion takes at least one hour of total time for the APP, requiring time to review each case prior to the discussion, coordinate a meeting time with the insurer, and conduct the discussion (K. Kemper, personal communication, September 2022). This means that APPs currently spend approximately three hours per month on peer-to-peer discussions (K. Kemper, personal communication, September 2022). This bears substantial time burden for the APP and is a source of frustration.

During the meeting, the craniofacial APP share several evidence-based risk factors and explains her physical exam findings in the context of the 3-dimensional deformity (K. Kemper, personal communication, September, 2022). They then discuss the trajectory of the disorder including alternative treatments tried and the patient response (K. Kemper, personal communication, September, 2022). Sometimes, these peer-to-peer discussions are effective, but they are also frequently unsuccessful. If the appeal is denied, families are faced with the choice to pay out-of-pocket for helmet therapy or no longer proceed (K. Kemper, personal communication, September, 2022). Once a decision is made as to whether to proceed, the laser scan is sent to the laboratory for construction of a custom cranial remodeling orthosis (S. Stackhouse, personal communication, August 2022). Approximately two weeks later, the helmet

is sized to the infant and therapy is initiated (S. Stackhouse, personal communication, August 2022).

Project Intervention Plan

Problem and Purpose Statements

Currently, the measurement techniques and anthropomorphic measurements utilized to quantify helmet therapy are prone to error and often do not fully encapsulate the extent of asymmetry. The current most-commonly utilized measurement technique involves digital caliper measurements of cranial vault asymmetry, which represents a 2-dimensional evaluation with variability due to hair artifact, infant compliance, and user variation that can fail to capture occipital and parietal displacement due to the nature of the measurement. A cost-free three-dimensional laser scan is subsequently obtained by the orthotics team, which is used as a 3-dimensional model of the skull. This, in conjunction with the trained craniofacial provider's professional judgment, allows full analysis of the extent of deformational plagiocephaly. However, currently, many insurance companies rely on CVA measurements to restrict reimbursement due to a limited understanding of the commonly used measurements and the multidimensional impacts of DP on cranial and facial asymmetries. Additionally, the insurance approval process is often delayed by lengthy correspondence with insurers for prior authorizations and peer-to-peers, which may negatively impact patient outcomes.

The purpose of this project was to devise an education tool that could be integrated into both the current insurance approval process and peer-to-peer discussions for children with diagnosed DP. The tool highlights the issues with reliance on caliper-based anthropomorphic measurements and emphasizes the role of the trained craniofacial provider's recommendation based on the three-dimensional analysis of each patient's head shape and asymmetry and history

of the deformity. It highlights the common errors associated with CVA measurement and the limits of its relevance in determining helmet therapy need. It also includes the information primarily included in the peer-to-peer discussion including the relevance of the persistence of the deformity, the importance of the 3-dimensional evaluation, and a special emphasis on the timeliness of helmet therapy. The aim is to streamline the discussion and be available as a reference during the discussion.

Proposed Implementation Plan

This project was studied utilizing the plan, do, study, act (PDSA) model for quality improvement (Taylor et al., 2014). I utilized a comprehensive literature review to plan the project and implement the document. Secondly, utilized this information and my clinical knowledge to create the document utilizing the literature reviewed. The document includes the following sections: deformational plagiocephaly overview, treatment, helmet therapy evidence, current evaluation techniques utilized including CVA and 3-dimensional scanning, limitations of current reliance on CVA, timeliness of intervention, and a summary. There was no additional funding for the tool necessary. This document was included in the initial submission to insurance companies for infants who are recommended to benefit from helmet therapy and who require prior authorizations for treatment. It was also available for reference during peer-to-peer discussions with insurers to provide additional context for the APP recommendation.

To study the intervention, a prospective analysis was obtained regarding de-identified insurance denials for October through December of 2022 for cranial remodeling orthoses. After the intervention was implemented, a prospective analysis was completed, which compared the rate of prior authorization requests, peer-to-peer discussions, timeliness of response, and denial rates between pre-and-post-implementation time periods. It is important to note that, due to time

constraints of project completion deadlines, these results only reflect a limited period and will need continued PDSA within the immediate future. In addition to the data, pre-and-post-implementation surveys were sent to craniofacial staff who work directly with insurance companies to obtain coverage. The surveys examined the perceptions and experiences of these individuals in advocating for families to obtain coverage and qualitatively examined their perspectives on the plagiocephaly PA process both before and after the document's implementation. Lastly, I reviewed the outcomes of the study and determined the tool's impact and recommendations for future use.

Key stakeholders involved in this project included craniofacial advanced practice providers, staff at the orthotics group, insurance companies, and children and their families. The APPs were indirectly impacted by the timeliness of the response and the number of peer-to-peer requests. Additionally, staff at the organization were involved throughout the process. Orthotists helped review the document for accuracy, clarity, and impact, and care coordinators integrated the new document into their process when submitting the request for insurance approval. These orthotics administrative staff were questioned regarding their experience with insurers, and their pre-and-post-intervention experiences were collected for analysis. Insurance companies were involved in the receipt of the document and determination of the coverage outcome. Finally, children and their families were impacted by their timely access to helmet therapy and financial responsibilities pending the insurer's decision.

Outcome Measures

- **Outcome Measure 1:** Following the implementation of the tool, the orthotics team will face fewer initial insurance rejections compared to before the use of the tool as evaluated by the rate of denials over a one-month study period.

- **Outcome Measure 2:** In the one-month period of implementation, the craniofacial APP will spend less time and effort during the peer-to-peer discussion as evidenced by a decrease in the number of peer-to-peer discussion requests.
- **Outcome Measure 3:** 50% of orthotics staff surveyed state there has been an increase in perceived productivity regarding time spent on prior authorization and denial communication as indicated by Likert scale evaluation.
- **Outcome Measure 4:** 50% of orthotics staff surveyed report the tool has positively impacted family outcomes compared to before its implementation.
- **Outcome Measure 5:** In the one-month period of implementation, insurer response time will be significantly shorter compared to prior to the intervention.

Process Measures

- **Process Measure 1:** The preliminary draft of the tool was developed by January 2023.
- **Process Measure 2:** The final draft of the document was reviewed and approved by March 2023.
- **Process Measure 3:** The tool was implemented on March 16, 2023.
- **Process Measure 4:** The pre-implementation survey was distributed by January 2023.
- **Process Measure 5:** The pre-implementation survey was completed by staff by February 2023.
- **Process Measure 6:** The post-implementation survey was distributed in April 2023.
- **Process Measure 7:** The post-implementation data collection was completed by April 25, 2023.

Measurement Plan

In conjunction with the orthotics group, I collected deidentified data regarding initial insurance denials for patients from January 2022-December 2022. The data collected was assigned a number to each case to non-specifically identify each patient. The data included age at the time of the request, initial measurements (CVA, CI), general insurance type (public vs private), denial history and insurer response time, and whether the family paid out-of-pocket. This data was compiled in Google Sheets. Following the intervention, a similar retrospective data collection occurred following one month of implementation. Data included the same categories and was added to the document for analysis. Mean values for pre-and-post-implementation were obtained. In addition to this objective data, the subjective experiences of the care coordinators and orthotists were obtained and analyzed. I evaluated their perceptions of both the current state of insurance denials and their perceptions of the changes associated with this implementation. Participants in both pre-and-post-implementation surveys received a $5 gift card from a local coffee shop as compensation for their efforts.

Evaluation and Analysis Plan

Data was compiled in a Google Sheets document via Google Drive for further analysis. Each patient was assigned a non-specific identifying number that will be utilized to aggregate data while adhering to HIPAA privacy rules. Information to be collected is not identifiable and therefore does not require higher level software protection per IRB decision. The data was analyzed to find the mean of the following factors: asymmetry, mean age, and insurance type. The percentage of families that chose to pay out-of-pocket was determined and the insurer response time was also evaluated. The same categories of data were collected and analyzed one month after project initiation to determine whether there was a substantial benefit associated with the intervention. The results are limited by the timeline of initiation and results.

Data Management Plan

Data was non-identifying and therefore was stored on Google Sheets. There is no need for HIPAA-compliant software use per IRB. Data was saved via a cloud-based website to ensure continuous access and preservation of the data collected. The data will be saved for five years so that the orthotics group can best quantify its outcomes.

Sustainability Plan

The document was designated with my name as part of our partnership. After completion of the project, I granted permission for use and alteration of the document to the plagiocephaly team at the orthotics group. The head orthotist within the plagiocephaly program will continue to own the document and modify it as needed. The orthotics group will continue to use the document and, if desired, they can also continue to track its impact within their patient population.

Results

Overall, our results demonstrate an existing need prior to project implementation and significant improvements in several areas after the tool was integrated into the process. The process was a very low-cost intervention that saved the company time and streamlined the process. While the results were only collected over a period of one month, they demonstrate an encouraging trend towards improved insurer responses, streamlined communication for the craniofacial team, and improved access to care for patients.

Pre-Implementation Survey Results

The results of the survey overwhelmingly supported the hypothesis that the current insurance reimbursement process is perceived to be challenging in many respects for patients and staff within the organization. 100% of staff agreed that the insurance reimbursement process for

plagiocephaly was challenging for patients and their families, and many agreed staff agreed the primary stressors were related to the financial and emotional response to the PA approval process (Appendix D). Similarly, 90% of participants agreed that the insurance reimbursement process was time-consuming for their team and that communication with insurers carried a significant administrative burden for them (Appendix D). These findings affirm the importance of this project in aiming to streamline the process and highlight the multiple dimensions of impact both on patient experience and staff burden.

When asked what the staff perceived to be the primary challenges of the insurance reimbursement process, there were several important themes. The most common theme was the perception that insurers did not understand the timeliness of their response in respect to patient outcomes (Appendix D). This is especially important given its direct impact on access to helmet therapy for patients, which may result in later initiation of therapy and therefore decreased corrective ability. A second prevalent theme was regarding the controversy of helmet therapy, specifically that some insurers utilize several studies that found no difference in helmets vs repositioning to justify the denial or heavy restriction of coverage for this therapy (Appendix D). A third theme was the difficulty with highly restrictive rules by insurers on coverage, particularly in the case of children with moderate plagiocephaly (Appendix D). Lastly, there was a perception that insurers did not fully understand the process within the craniofacial department and the reasoning behind the recommendation for helmet therapy (Appendix D). All these themes were considered during the creation of the project and provided valuable context for the structure and efficacy of the document.

Pre-Implementation Data

The data collected before implementation demonstrated that many insurers heavily restrict or limit reimbursement for cranial remodeling orthoses (S. King, personal communication, August 2022). Between July 1, 2022, and October 30, 2022, 10.5% (n=16) of infants with plagiocephaly had insurance policies that required prior authorization approval by their insurance company. Of those cases, 75.0% (n=12) of the cases were insured by United Healthcare. The other insurance groups that denied coverage included 6% Wisconsin Medicaid (n=1), 6% Cigna (n=1), and 12.5% (n=2) Blue Cross Blue Shield.

After the initial prior authorization request was sent, 32% (n=5) were approved for coverage, 68% (n=11) were denied coverage. If initially denied, a peer-to-peer is requested to discuss the medical recommendation with an insurance team representative. Of the cases that were denied, 37.5% (n=6) required a peer-to-peer discussion. One family decided to not proceed after notification of the initial denial. After the peer-to-peer was completed, three patients were approved, and three patients were denied. Overall, 50% (n=8) of insurers eventually approved helmet therapy, and 50% (n=8) denied coverage.

On average, insurers took approximately 10 days to respond to the initial prior authorization request. The minimum initial response time was four days, and the maximum response took 36 days. In total, the time taken from PA submission to final reimbursement decision after peer-to-peers and appeals were completed took an average of 18 days. The minimum time period was four days, and the maximum was 46 days.

In summary, of the 16 children included in data from July through October of 2022, the PA process presented significant delays in treatment that resulted in later helmet initiation, which is correlated with poorer corrective outcomes.

Post-Implementation Survey Results

Overwhelmingly, survey participants indicated that the tool appeared to have significantly decreased their administrative burden and improved patient experiences. When asked whether participants felt the tool clarified the craniofacial team's recommendations for insurers, many participants agreed that this was true. With respect to the craniofacial staff's workload, the majority agreed that the tool had decreased the time and effort spent on reimbursement. Similarly, participants overall agreed that the tool seemed to have more timely responses from insurers, affirming what the data demonstrates. Lastly, the vast majority of participants strongly agreed that the tool significantly improved the plagiocephaly patient and family experience.

Post-Implementation Data

Because the tool was not implemented until mid-March, data for the post-implementation period was limited to the time between March 20 and April 20, 2023. During this time, 17 patients had insurers who required prior authorizations for helmet therapy. Of those patients, 35% (n=6) were insured by United Healthcare, 41% (n=7) were insured by Blue Cross Blue Shield, 11.7% (n=2) were insured by Cigna, 5.8% (n=1) were insured by Aetna, and 5.8% (n=1) were insured by Hennepin Health.

After the initial prior authorization was submitted, 82.3% (n=14) were approved and 17.6% (n=3) were denied. There were no requests for peer-to-peer discussions or appeals during this time compared to the 37.5% pre-implementation peer-to-peer rate.

Insurers responded to the initial PA request within an average of three days. The minimum response time from insurers was a same-day response and the longest response was seven days. This demonstrated a substantial decrease in insurer response time, with a p-value of 0.00009, demonstrating a very high level of statistical significance.

Discussion

Despite the limited literature regarding the efficacy of insurer outreach, this study demonstrated that proactive outreach resulted in several beneficial changes for the care team and patient. The impacts of the study included an improved insurer response time, a decrease in requests for peer-to-peers discussions with the APPs, and improved insurance approvals of coverage. These findings are significant for craniofacial APPs, craniofacial staff, and patients and their families as these factors contribute to workplace satisfaction and the ability to perform clinical activities. Additionally, improvements in these factors significantly improves the ability for patients to begin helmet therapy in a timely fashion and thereby achieve correction of their plagiocephaly. The results of this study also affirm similar studies which have demonstrated that proactive insurer outreach was more likely to result in positive outcomes and increased timeliness of insurer responses (Cutler et al., 2016; Hecht et al., 2021; Martin et al., 2016; Vishwanath et al., 2021). Overall, this study suggests that improved communication between care teams and insurers may significantly benefit staff and patients alike.

Although these factors must be astutely examined within the context of the many influencing variables, they represent significant and widespread improvements to the current process. Other studies examining proactive interventions within the prior authorization process also demonstrate that insurer outreach may improve medical staff experiences, timeliness of response, and patient access to care (Hecht et al., 2003; Cutler et al., 2016; Martin et al., 2016; Vishwanath et al., 2021). For example, pharmacy-led interventions were investigated and resulted in decreased administrative burden, timeliness of response, and access for patients to care (Hecht et al., 2003; Cutler et al., 2016; Martin et al., 2016). They all found significant improvements in the timeliness of insurer responses and improved access to care for patients,

thus affirming the results within this project. Outside of pharmacy outreach, another study by Vishwanath demonstrated that proactive outreach within a medical primary care setting improved the timeliness of insurer decisions and increased PA approvals (Vishwanath et al., 2021). This further validates the study's findings.

This research had several strengths, including a combination of objective data on insurer outcomes and the subjective data of surveys obtained from craniofacial staff. The objective data demonstrated significantly improved insurer response, approvals, and reductions in appeals and peer-to-peers. However, there are many limitations associated with these results. For example, each data set included individual infants with unique measurements, treatment histories, and insurers. These may impact the approval decision and limit the results. In addition to variation in the patient data, it is crucial to recognize that the time of data collection and project implementation is short, which may limit the significance of the results. Additional time is necessary to further evaluate the impact, validity, and reliability of the proactive insurer outreach tool.

Overall, this study supports the hypothesis that proactive insurer outreach positively impacts provider administrative burden and patient care access, subsequently improving patient outcomes. Because helmet therapy is most effective when begun before six months of age, this may significantly and directly impact patient outcomes through fewer delays in treatment. Improved access to treatment and fewer insurer-related communications may also be beneficial for patient experience within the financial approval process. Supporting this, the majority of surveyed staff agreed that the tool improved patient and family experience. In addition to patient outcomes and experience, craniofacial staff perceived substantial improvements in their

administrative burden. This suggests that the tool's positive impacts may decrease staff burnout, with meaningful implications for long-term job satisfaction and productive clinical time.

This project demonstrated the wide impact of a cost-effective proactive insurer outreach tool within the craniofacial field. The pamphlet itself is relatively inexpensive and easy to implement, making it an excellent tool to translate into other areas of complex insurance situations. Within the orthotics company, the project remains very sustainable and will be maintained and regularly updated by the plagiocephaly leadership team.

Given its many influencing variables, it may be helpful for future research to narrow the intervention to focus on a more standardized subject with fewer influencing factors in order to better quantify the impact of proactive insurer outreach. Other areas requiring prior authorizations, such as PA requirements for standard imaging studies for management of craniosynostosis may present excellent opportunities for similar projects to improve the process. Within plagiocephaly, the project may be expanded to other orthotics treatment teams to analyze patient outcomes and provide additional data on the reproducibility of these outcomes within similar settings. Ultimately, these findings open an exciting new avenue of study to focus on insurer outreach and its impact on the timeliness of insurer response, administrative burden, and access to care, which can be translated to other settings to improve similarly complex processes.

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Appendix A

Jung & Yun, 2020

Appendix B

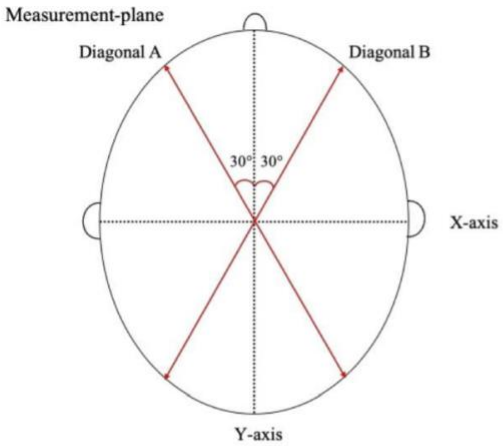


Figure 3. Measuring cranial asymmetry (CA). Two diagonals (A and B) are drawn 30° from the Y-axis on level 3. CA (mm) = Diagonal A–Diagonal B. This figure was cited from reference [12].

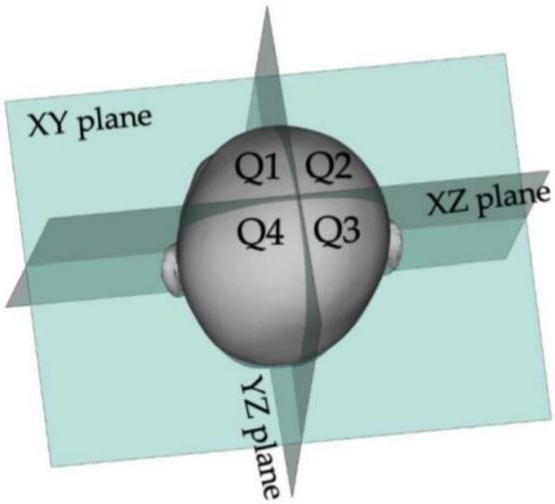


Figure 2. Four quadrant volumes. The total volume was divided into four quadrants along the XZ and YZ planes. Each quadrant volume was used to quantitatively define the bilateral symmetry ratio of ASR (Q1 volume/Q2 volume, or vice versa × 100, %) and PSR (Q3 volume/Q4 volume, or vice versa × 100, %); a value where either the Q1 volume/Q2 volume, Q3 volume/Q4 volume, or vice versa, is <100% was chosen. ASR, anterior symmetry ratio; PSR, posterior symmetry ratio.

Koto et al., 2022

Appendix C

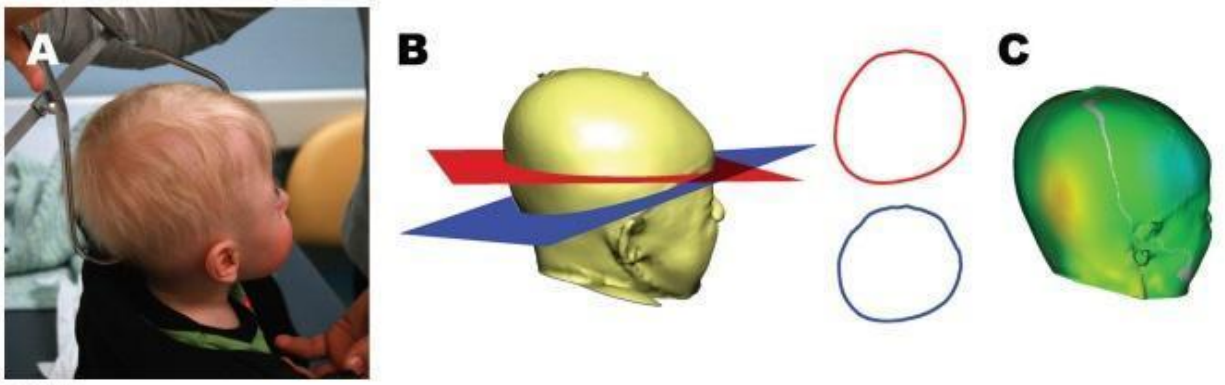
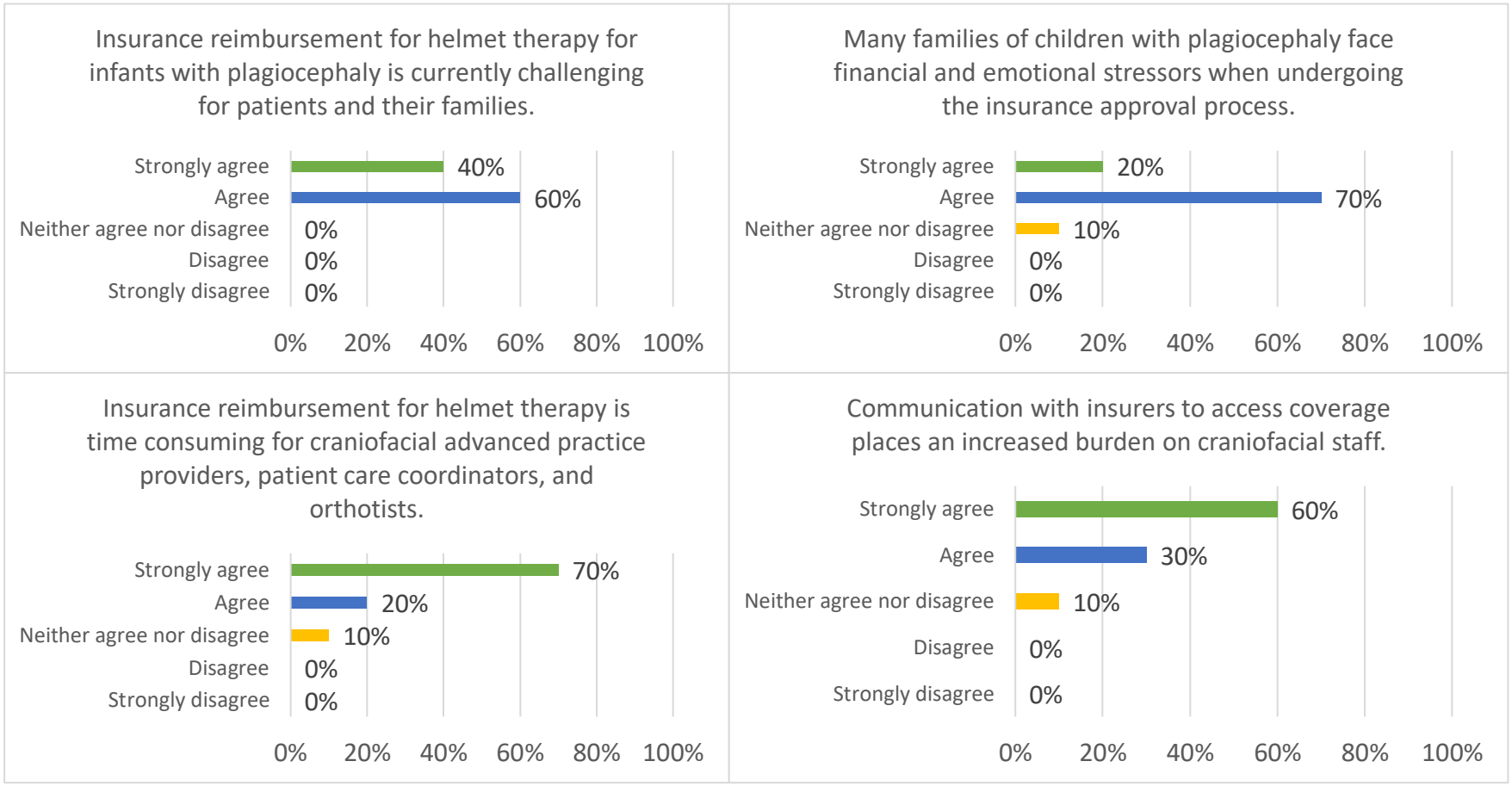
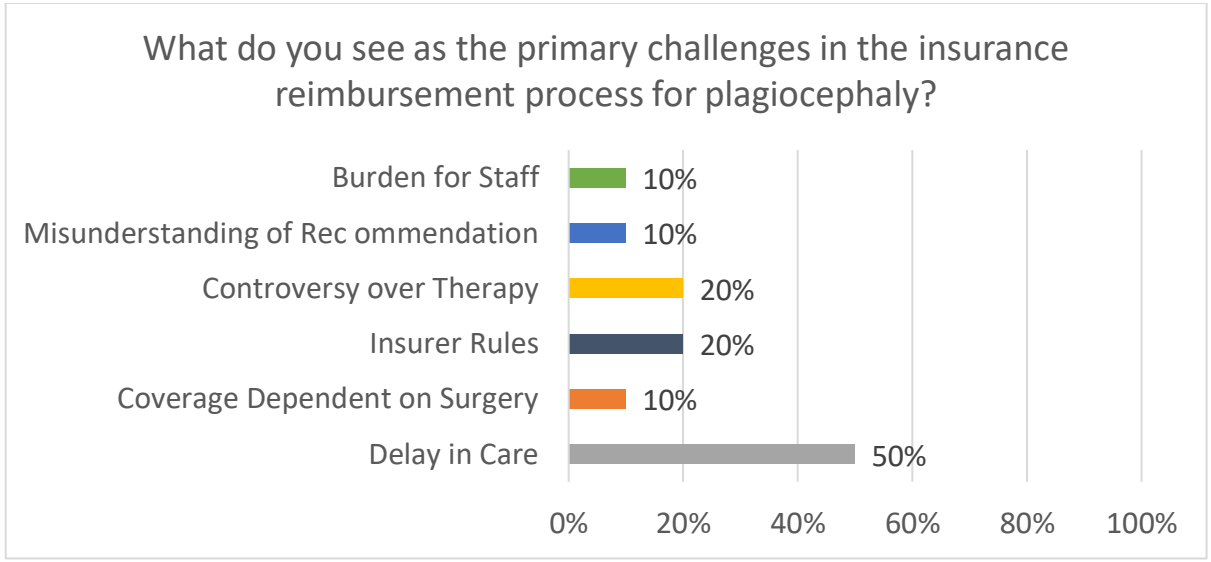


FIGURE 1
A, Direct caliper measurement on a child. *B*, Illustration of potential error of 2D plane selection. Red and blue outlines illustrate the different shape of cross-sections obtained from different plane selections. *C*, Head surface color-coded according to pointwise amount of asymmetry. Red and yellow indicate flattened area.

Lipira et al., 2010

Appendix D: Pre-Implementation Questionnaire Results




What do you see as the primary challenges in the insurance reimbursement process for plagiocephaly?
Burden for Staff
10%
Misunderstanding of Rec ommendation
10%
Controversy over Therapy
20%
Insurer Rules
20%
Coverage Dependent on Surgery
10%
Delay in Care
50%
0%
20%
40%
60%
80%
100%

Appendix E: Pre-and-Post Implementation Data

Table 1

Pre-Implementation Data Collected Between July 1, 2022, and October 30, 2022, for Patients Requiring Prior Authorization (PA) to Determine Insurance Coverage of Helmet Therapy

Date Range: 7/1/22 - 10/30/22					
ID	Insurance Company	Findings		Days Between PA Submission to Initial Insurer Response	Days Between PA Submission and Final Decision
1	United Healthcare	PA Required, PA Approved	PA submitted 8/22; approved 8/30	8	8
2	Blue Cross Blue Shield	PA Required, Letter of medical responsibility needed, Approved	PA submitted 8/22; approved 8/31	9	9
3	Blue Cross Blue Shield	PA Required, PA Denied, Peer-to-Peer Approved	PA submitted 9/19; denied 9/28; trying to schedule P2P;	9	22
4	Cigna	PA Required, PA Denied	PA submitting 9/14; denied 10/20	36	36
5	United Healthcare	PA Required, PA Denied	PA submitted 7/15; denied on 7/22 as PA denied for: The	7	7
6	United Healthcare	PA Required, PA Denied, Peer-to-Peer Denied	PA submitted 7/13; denied 7/18; P2P denied on 8/4	5	22
7	United Healthcare	PA Required, PA Denied, Peer-to-Peer Approved	PA submitted 8/19; denied 8/24; P2P scheduled; approved	5	38
8	United Healthcare	PA Required, PA Denied, Peer-to-Peer Denied	PA submitted 8/11; denied 8/16; P2P scheduled but medical	5	5
9	United Healthcare	PA Required, PA Approved	PA submitted 8/24; approved 8/31	7	7
10	United Healthcare	PA Required, PA Approved	PA submitted 8/22; approved 8/26	4	4
11	United Healthcare	PA Required, PA Denied, Appeal Approved	PA submitted 7/7; denied 7/11; required P2P 7/12 but	4	46
12	United Healthcare	PA Required, PA Denied	PA submitted 9/30; denied 10/10	11	11
13	United Healthcare	PA Required, PA Denied	PA submitted 9/23; denied 10/10	17	17
14	United Healthcare	PA Required, PA Denied, Peer-to-Peer Denied	PA submitted 8/17; denied 9/6; P2P denied 9/28	19	41
15	United Healthcare	PA Required, PA Denied	PA submitted 9/23; denied 10/10	14	14
16	Wisconsin Medicaid	PA Required, PA Approved	PA submitted 8/24; approved 8/29	5	5

Table 2

Post-Implementation Data Collected Between March 20, 2023, and April 20, 2023, for Patients Requiring Prior Authorization (PA) to Determine Insurance Coverage of Helmet Therapy

Date Range: 3/20/2023 - 4/20/2023					
ID	Insurance Company	Findings		Days Between PA Submission to Initial Insurer Response	Days Between PA Submission and Final Decision
1	United Healthcare	PA Required, PA Approved	PA submitted 3/21; approved 3/21	0	0
2	Aetna	PA Required, PA Approved	PA submitted 3/24; approved 3/24	0	0
3	Cigna	PA Required, PA Denied	PA submitted 3/28; denied 3/31	3	3
4	United Healthcare	PA Required, PA Approved	PA submitted 3/29; approvied 3/31	2	2
5	United Healthcare	PA Required, PA Denied	PA submitted 3/29; denied 3/31	2	2
6	United Healthcare	PA Required, PA Approved	PA submitted 4/3; approved 4/5	2	2
7	Cigna	PA Required, PA Denied	PA submittted 3/31; denied 4/5	6	6
8	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/4; approved 4/11	7	7
9	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/5; approved 4/7	2	2
10	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/7; approved 4/12	5	5
11	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/7; approved 4/12	5	5
12	Hennepin Health	PA Required, PA Approved	PA submitted 4/7; approved 4/7	0	0
13	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/7; approved 4/12	5	5
14	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/7; approved 4/12	5	5
15	United Healthcare	PA Required, PA Approved	PA submitted 4/11; approved 4/12	1	1
16	United Healthcare	PA Required, PA Approved	PA submitted 4/12; approved 4/17	5	5
17	Blue Cross Blue Shield	PA Required, PA Approved	PA submitted 4/13; approved 4/18	5	5

Table 3

Summary Table Comparing Pre-and-Post Implementation Data for Patients Requiring Prior Authorization (PA) to Determine Insurance Coverage of Helmet Therapy

Pre-Implementation Data July 1, 2022 - October 30, 2022		**Post-Implementation Data March 20, 2023 - April 20, 2023**	
Sample Size	n= 16	Sample Size	n= 17
Average Days from Submission to Initial Response	10 days	Average Days from Submission to Initial Response	3 days
Average Days from Submission to Final Insurer Decision	18 days	Average Days from Submission to Final Insurer Decision	3 days
Minimum Days from Submission to Final Decision	4 days	Minimum Days from Submission to Final Decision	0 days
Maximum Days from Submission to Final Decision	46 days	Maximum Days from Submission to Final Decision	7 days
% of Insurers Requesting Peer-to-Peer Discussion	37.50%	% of Insurers Requesting Peer-to-Peer Discussion	0%
% of Insurers Approving	50%	% of Insurers Approving	82%
% of Insurers Denying	50%	% of Insurers Denying	18%

Appendix F: Post Implementation Questionnaire Results