

Joint Vibration Analysis: A General Practice Shouldn't be Without It!

BioRESEARCH / Pride Institute White Paper

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The Issue:

Understanding that the Temporomandibular Joints (TMJ) are the skeletal foundation of the stomatognathic system, and without stable TMJ's a stable occlusion is impossible. Have



you wondered why porcelain keeps fracturing or posterior composites seem to break down too quickly? Have you had patients complain of TMJ dis-

comfort after even simple restorative care? Are you concerned that you have little documentation in a patient's chart regarding the health of the TMJ prior to starting restorative care? As you recall your Hippocratic Oath, are you confident that as you begin treatment of your patients you will truly do no harm?

The last thing you want as a dentist is to have a patient complain of joint problems or pain after treatment. Your patient may have TMJ problems that were asymptomatic but became symptomatic after treatment. Guess who gets the blame?

Even the GP who does mostly single tooth restorations can negatively affect the joint with a restoration that creates a parafunction. So it behooves the dentist who wants to decrease post-treatment problems and provide comprehensive care to know the condition of the joint beforehand. If your treatments are altering the vertical, lateral, or anterior/posterior position of your patient's mandible it is essential to know the impact those changes are having on your patient's craniofacial physiology. More and more dentists want to take the guesswork out of traditional approaches such as palpation, the stethoscope, the Doppler, or sonography. Such subjective measurements are no longer state-of-the-art.

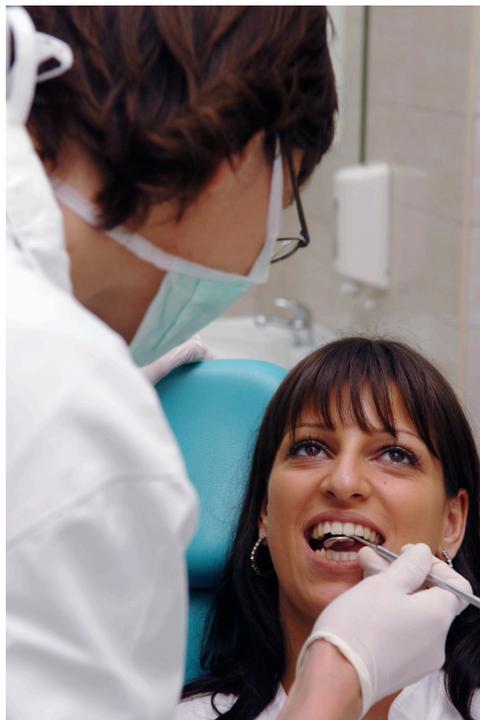
The Solution:

The Joint Vibration Analysis instrument provides objective testing that determines a base-



Bio-Research Associates, Inc. develops and produces highly innovative and advanced products for the evaluation of dysfunction in the temporomandibular joint, the craniofacial musculature and the overall stomatognathic system.

About Pride Institute



Pride Institute is a leading practice management company that empowers dentists with proven business solutions. Founded by Dr. Jim Pride in 1976, Pride's philosophy is to develop new models and methods that address the ever-evolving needs of their clients. They believe every new piece of technology and advance in systems affects how doctors manage their practices. The Institute provides educational opportunities for dentists and their teams in various courses given around the country. In depth diagnostics provide clients with customized programs designed to develop systems that align with the practice vision, enhance team development and leadership skills required to meet the needs of 21st century dental practices. For more information visit us at www.PrideInstitute.com.



line for the patient and provides for accurate and reproducible tests prior to, during and after treatment. This white paper discusses Joint Vibration Analysis by BioRESEARCH Associates, Inc. (BioJVA) and its implementation into general dental practices as a screening device as well as an objective measurement tool in both diagnosis and treatment. BioRESEARCH Associates, Inc. has incorporated vast amounts of research in the field of Joint Vibration Analysis into the development of technologies that aid the dentist in the diagnosis of joint health: this marriage of research and technology gives the clinician more options for comprehensive diagnosis. BioRESEARCH Associates, Inc. has developed a joint vibration analysis instrument referred to as BioJVA. Complementing this are additional armamentarium to enhance diagnostic and treatment acumen (BioPAK).

What is JVA?

Joint Vibration Analysis is based on simple principles of motion and friction. When smooth surfaces rub together, little friction is created. Normally functioning joints are smooth and, in addition, have lubrication, further decreasing friction. However, friction is created when rough surfaces rub together and vibration results. Degenerative changes to the joint, tears in the soft tissues and displacements of the disk cause surface changes, thus creating friction and vibration. Different disorders produce different wear patterns and these result in different and distinctive vibration patterns or "signatures". BioJVA, a computer assisted technique which uses vibration transducers in headphones placed over the TMJs, helps identify these signatures and distinguish various TM disorders.

No matter what your philosophy of occlusion and treatment modalities, whether you treat some TMD or refer, TMJ physiology is the cornerstone of all dentistry. BioJVA is a screening tool which gives the dentist the ability to ef-

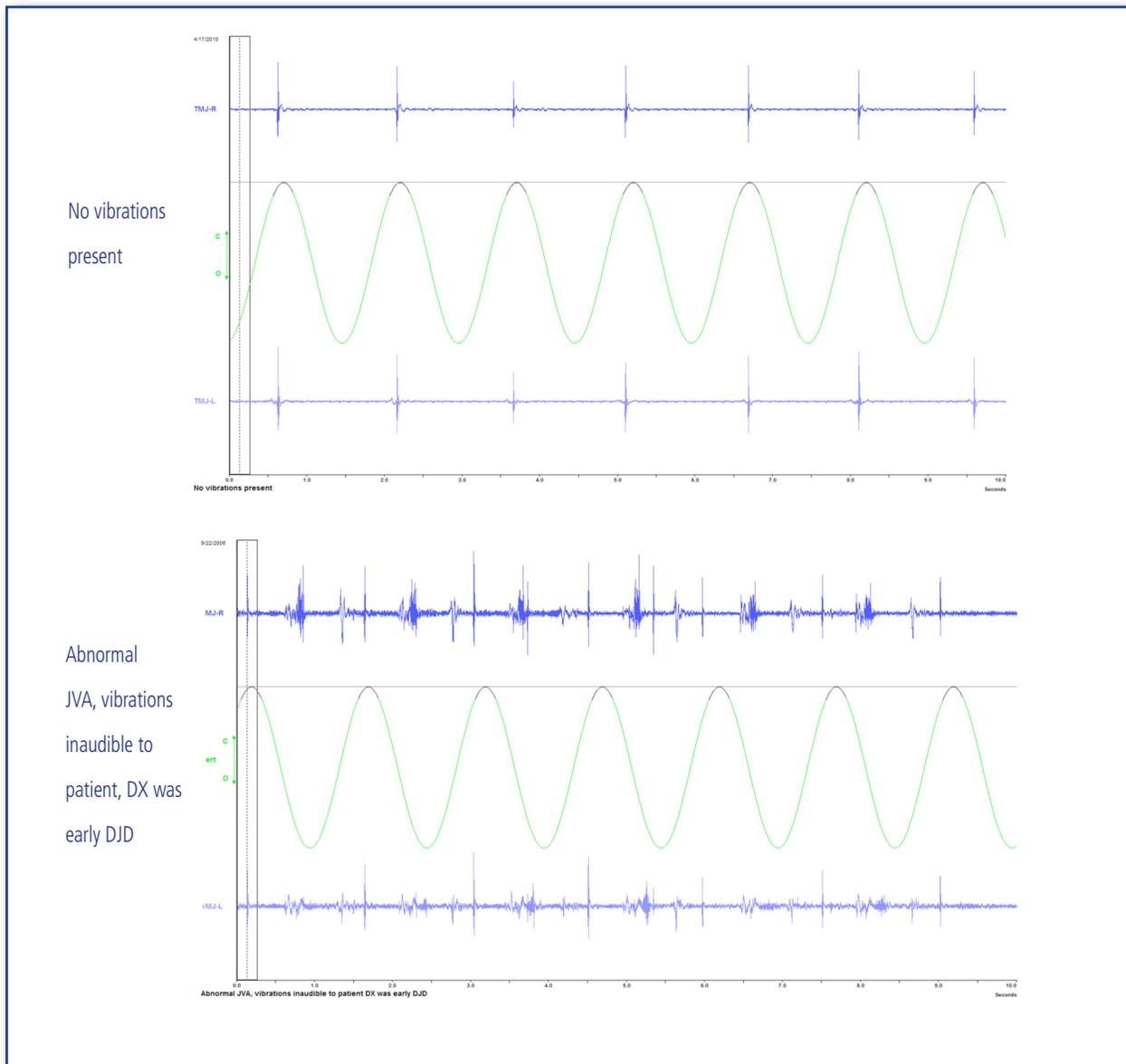
fectively document and provide a three pronged report on all patients:

1. The presence and nature of vibrations
2. The range of motion of the joint
3. The presence or absence of significant deviations or deflections

BioJVA offers specific information about the TMJ that simply cannot be obtained with traditional approaches. The biggest advantage is getting simultaneous readings on both the right and left TMJ during movement determining

very quickly whether the patient has any signs of degenerative changes in the joints. Involving the patient early in a comprehensive diagnosis of their entire stomatognathic system at the very least creates a conversation about comprehensive care. More conversations about comprehensive care mean more dentistry.

The two graphs below illustrate the ease of recognition of both normal and abnormal joints. The top line of each graph represents the right side joint vibrations; the middle the jaw movement; and the bottom, the left side vibrations. In comparison of the two graphs, one can easily



recognize the difference in vibrations between the normal (top graph) and abnormal/increased vibrations (bottom graph). Presentation of this difference to patients brings an awareness of joint health and can initiate a conversation about treatment options. In any case, this documentation provides the baseline data of joint function that should be part of any comprehensive evaluation.

Analysis Methodology

Pride Institute consultants Dr. TerryLynn Tennant (also a practicing dentist in Eugene, Oregon) and Mary Lynn Wheaton, Director of Consulting at Pride Institute interviewed, monitored and analyzed clinicians at various levels of implementation of incorporating BioJVA and more extensive measuring devices into their dental practices.

Three practitioners cooperated in the research efforts to provide information necessary to evaluate JVA and determine its usefulness in the general practice setting.

The first clinician was Dr. Frank Graziano of Tuckahoe, New York who added BioJVA in December of 2009. His motivation for adding BioJVA was to enhance the screening of his patients following the guidelines of the Pankey Institute and the Dawson Academy which mandates that all occlusal analysis starts with the TMJ.

The next clinician, Dr. Greg Pyle of Muncie, Indiana added BioJVA in 2005. He enhanced this with the JVA/JawTracking/T-Scan system in 2007 to provide more in-depth care for patients that were presenting with TMJ and occlusal issues found by his routine TMJ exam with JVA. Dr. Pyle's interest in sleep disorders and his knowledge that the fabrication of snoring appliances for patients can have an iatrogenic effect of subsequent TMD also contributed to his further involvement.

Dr. Mark Montgomery, our third clinician is the most experienced clinician interviewed in the usage of the diagnostic instruments. He uses the entire suite of BioMetric diagnostics from BioRESEARCH (JVA, EMG Jaw Tracking with Mastication Analysis, T-Scan and the T-Scan EMG). Dr. Montgomery's practice is located in Portland, Oregon and he lectures throughout the country on occlusion.

These doctors' perspectives will be highlighted in the following four areas:

1. Motivation for the adoption of BioJVA as a diagnostic
2. The process and timeline of integration of BioJVA into a general practice
3. Training that supports the dentist and the team in the implementation of BioJVA with their patients
4. The active and passive returns on investment as well as the observed benefits of screening the practice's dental population with BioJVA

Why did you elect to utilize JVA?

Dr. Graziano, as a visiting faculty member at Pankey Institute, teaches that without a stable TMJ you can never expect to achieve a stable occlusion. He chose to add BioJVA to his practice and saw how easy it was to incorporate into his existing system of examination of the patient.

Dr. Pyle was originally introduced to BioJVA during a course on occlusion taught by Dr. Montgomery. Dr. Pyle was trying to figure out why he was having so many porcelain "failures". Learning more about occlusion and the TMJ started to put the "whole picture" together for him. Dr. Pyle stated, "when I started doing more full mouth cases, as well as "smile designs", I realized I needed to know the condition of the TMJ prior to putting porcelain on teeth."

Various methods of radiography (panolipses, tomograms, C-T scans, contrast arthrography and MRIs) were Dr. Montgomery's primary diagnostic tools prior to JVA. His concerns with these methods were their subjectivity, cost and invasiveness. Even with meticulous measuring of the joint movements, he would occasionally encounter a false negative in the graph tracing which unnecessarily complicated the diagnostic work-up for his complex treatment cases. After implementing JVA into his practice, he found his success at establishing the occlusion and comfortable TMJs increase dramatically. "With BioJVA, I determine the intensity, frequency, pattern, and location of the joint vibrations. This helps me to diagnose and treat very effectively."



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The portability of the equipment makes it easy to utilize in any operatory or other space deemed appropriate. The wearing of a headset for the patient is similar to wearing regular headphones. Having a laptop again adds to its portability. Integration of the mechanics into the practice is simple and is described next.

Process and Timeline of Integration

Incorporating BioJVA into the examination of patients requires little disruption of the existing procedure times in the appointment schedule. All three clinicians reported incorporating the BioJVA in similar fashions. Simply adding it into the "New Patient Experience" as an enhancement to existing diagnostics is the common approach. New patients are screened by asking questions about headaches/tension, any joint sounds or pain and then tested with the JVA "quick". This is a 10 second test performed by a team member. If there are any abnormalities in their reading, a JVA/JT (Jaw

Tracker) is scheduled into their treatment plan. All patients of record seen for continuing care are screened with the same questions and any patients with positive answers or plans for significant dentistry are given the JVA quick test. If there are any "blips" on the screen, an appointment is made to follow up with the JT (Jaw Tracker) portion of the diagnostic work up as well as a consultation to discuss what type treatment is indicated (including the potential fabrication of an occlusal appliance, if indicated).

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Training

Training is provided by the team at BioRESEARCH on basic techniques. An extensive two day course is included in the purchase to train the doctor in interpretation of the data. Staff is trained in-office and online by both BioRESEARCH team members and the dentists themselves. It behooves the dentist to explain the philosophy behind why they are gathering this data to the team as they will be asked questions by the patient. Much of the data gathering is performed by team members and it is important that they understand and can communicate the rationale for gathering this data. The learning curve of the team is quick. Team members can learn the mechanics of the instrument within 10 minutes!

Dr. Graziano reports his team started with its usage right away with the help of a 60 second training video on You Tube and thus they began recording and reading the JVA the first day they got it! He was able to perform "normal/

not normal” screenings immediately. The team at BioRESEARCH can even help clinicians read a trace by just emailing it to them. Continued training on-line, training at the headquarters of BioRESEARCH, and the BioRESEARCH Annual Conference all provide opportunities for the team to finish Basic and Masters level certification on JVA.

BioRESEARCH offers what they call “application” courses which cover every aspect of dentistry where the TMJ is important (restorative, orthodontic, implantology, TMD, and sleep medicine) and they approach each application from several philosophical angles. Dr.

Graziano reports, “even if I don’t practice a certain treatment philosophy, it’s very helpful to know how another dental professional would approach the problem I am facing.”

Return on Investment (ROI): Active and Passive Returns

Initial investment in the equipment necessary to perform BioJVA is approximately \$10,000. All three practices have reported increased Patient Case “Potential” (as Pride Institute defines as the average amount of *diagnosed* treatment), increased Patient Case “Value” (defined as the average amount of *accepted* treatment),

About BioRESEARCH Associates, Inc

Bio-RESEARCH Associates, Inc. develops and produces highly innovative and advanced products for the evaluation of the stomatognathic system. BioRESEARCH creates or carries unparalleled products, such the T-Scan III occlusal measurement system and their BioEMG III electromyograph, which can be combined to simultaneously measure and display the force timing and balance of the teeth and the craniofacial muscles. They are the sole manufacturers of the subject of this White Paper, the BioJVA (Joint Vibration Analysis) System, which provides a unique capability to quickly, inexpensively and non-invasively evaluate temporomandibular joint injuries, internal derangements and degenerative conditions. Pride Institute was proud to recognize BioRESEARCH Associates, Inc. for their contribution to new technologies by awarding them the Best of Class Technology Award for new emerging technology in the dental field at the Pride Institute Technology Fair at the Greater New York Meeting in November 2009.



more than just neuromuscular dentistry

increased fabrication of appliances, decreased re-dos and an increased number of referrals from patient internal referrals as well as specialist referrals which all represent real potential for ROI.

Utilizing BioJVA to inform a specialist prior to treatment (e.g. notifying an oral surgeon that there is disc movement and subsequent discomfort at a specific amount of opening gives the surgeon some guidelines in opening the patient for wisdom tooth removal) builds the professional relationship. Specialists are impressed with this level of care and detail. All practitioners indicated improved relationships with their specialists, especially orthodontists, prosthodontists and periodontists as well as physicians, especially those involved in treatment of sleep disorders.

Dr. Pyle reports production as a direct result of utilization of BioJVA and JT (Jaw Tracker) including occlusal appliances at just under \$100,000 in a three year period. This represents approximately 3% of his office production. And with the equipment fully paid off, he expects his ROI will continue to grow.

Charging for the service varies among the practices according to location, incorporation into exam fees (or not) and the doctor's philosophy. Dr. Graziano did not initially charge for the JVA screen because it only took a few minutes and the payback was knowing their TMJ condition, the impression of expertise that it gives to patients and the medical/legal protection that objective documentation provides. He is beginning to bill for JVA screening, especially for the more complex diagnostic workups where a special need for the JVA is indicated

Dr. Pyle reports a similar philosophy, providing the BioJVA quick at no charge, but those patients requiring the appointment for Jaw Tracker which takes about 15 minutes to complete, about 10 minutes for him to read, interpret and explain to the patient is a charged service (utilizing CDT Code 160). He also notes that

this leads frequently to fabrication of occlusal guards which generate additional income for the practice (utilizing CDT code 9940 is applicable for various appliances fabricated).

Dr. Montgomery's philosophy and his frequent utilization of more metrics have led him to incorporate the fees into a diagnostic work-up fee. He stated his philosophy as, "What is the return on investment of my high-speed handpiece? I include the JVA in my diagnostic work-up fee, and the time it ultimately saves me pays for it 10 times over."

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BioRESEARCH Associates, Inc. reports their clients report billing for BioJVA "quick" in the range of \$0 - \$151, and a fully interpreted report ranges from \$150 to \$400

A more "passive" return, not as easily measured but equally as important, is the confidence it gives the practitioner in the approach to diagnosis, treatment assessment and legal protection. Dr. Graziano states that he can quickly and easily determine if a patient has TMJ issues and can immediately test treatments to see if they are effective. "It helps me diagnose before splint therapy and test the efficacy of my splint therapy on TMJ function objectively, and immediately in my own office" he states. Additionally, he does not do any large cases without a diagnosis of the condition of the TMJ and the BioJVA is the perfect instrument to help him determine this. He further explains, "I don't want a subclinical pathology to be inflamed by everyday dental treatment just because I missed it! While this gives me some level of medical/legal protection, it is really just offering superior dentistry and the best care for my patients. I use the JVA to help

determine if I have (or can produce) stable TMJ function: if I can, great; if not, then I've documented it and can make my treatment decisions from there."

And lastly, BioJVA technology has a psychological impact on patients. Patients are intrigued by the BioJVA and feel this technology is yet another sign of a progressive, high tech and comprehensive approach to their care. Dr. Graziano reports, "Patients "get it" right away! They understand that grinding and clicking in the TMJ (whether audible or not) is not normal and appreciate that I am concerned with the health of their entire stomatognathic system."

Testimonial Summaries

Dr. Graziano finalizes his comments about BioJVA by saying, "the BioJVA opens up so many conversations about "comprehensive dentistry" that it has paid for itself by showing my patients I care for more than just their teeth."

The usefulness of this equipment is poignantly stated by Dr. Pyle, "At this point, I'm not sure I'd feel comfortable treating patients without the BioJVA. This piece of equipment not only gives me much more predictability with my dentistry, as well as another tool to help my patients, but it ultimately gives me peace of mind."

"The most important use of this instrument is that it allows me to establish healthy bite relationships for my complex cases. It makes me a better dentist," says Dr. Montgomery.

Conclusion

Dr. Tennant and Ms. Wheaton greatly appreciate the time and effort of our three clinicians to share their experiences of incorporating BioJVA into their general practices. It is our hope and the hope of the clinicians who contributed to this White Paper that general dentists appreciate the ease of incorporating this valuable tool into their practices. The benefits of JVA technology are evident for comprehensive patient care with the quality evaluation and documentation of the entire stomatognathic system. Increased treatment options provide for significant return on investment in the technology. Patients have a better understanding of their TMJ health and relation to their care. There are enhanced relationships with specialists. And lastly, the knowledge that you the dentist are utilizing appropriate, state-of-the-art technology to enhance patient care. Add these all up: priceless!

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