CASE STUDY · MUSCULOSKELETAL

Global Phase II Arthritis Trial With Quantitative Joint Imaging

Global Phase II · Hand and foot radiographs, joint MRI · Structural progression scoring

Challenge

Intrinsic Imaging supported this study’s imaging activities, addressing the scientific and operational considerations that inform the work of an imaging CRO and imaging core lab. A global Phase II trial investigated the safety and efficacy of a new pharmaceutical compound for arthritis, with imaging endpoints measuring structural progression in affected joints. Radiographic scoring of erosion and joint space narrowing and MRI assessment of synovitis, bone marrow edema and erosion are reader-intensive, semi-quantitative and sensitive to positioning and acquisition technique.

The sponsor needed consistent scoring across readers and timepoints to detect a treatment effect on slow structural change within a Phase II timeframe, and a protocol that sites with varied musculoskeletal imaging experience could execute reliably. Structural progression may be subtle over a limited observation period, making technical consistency important when distinguishing genuine change from scoring variation. Radiographic damage and MRI inflammatory findings describe related but different aspects of joint disease. Their interpretation should therefore preserve the distinction between established structural alteration and imaging features that may vary without corresponding irreversible damage.

Intrinsic Imaging’s Solution

Intrinsic Imaging's musculoskeletal team developed the imaging charter with standardized radiographic positioning for hands and feet and a joint MRI protocol specifying sequences, coverage and contrast use, and qualified sites with test acquisitions reviewed for positioning and image quality. Standardized positioning helps preserve comparable projection of joint anatomy, since apparent joint space and erosion visibility can vary with alignment. Defined MRI coverage and sequence selection establish the anatomical and tissue information available for scoring. Qualification review addresses whether sites can produce the intended examinations, rather than assuming that general imaging experience ensures suitability for a particular structural endpoint.

Fellowship-trained musculoskeletal radiologists scored radiographs for erosion and joint space narrowing and MRI for synovitis, bone marrow edema and erosion under validated semi-quantitative systems, reading each patient's complete timepoint series together with chronological order known, as the scoring methods specify. Independent double reads were performed on all patients with adjudication of score discrepancies above a predefined threshold. Reviewing the complete series provides longitudinal context for subtle findings, while knowledge of chronology can also introduce an expectation of progression that should be recognized when interpreting results. Independent double reads preserve separate judgments before adjudication. The discrepancy threshold defines when formal resolution is required, but agreement between readers is not itself evidence that a score difference is clinically meaningful.

Calibration sessions were held before and during the trial, reader agreement was monitored, and quality control at receipt verified positioning so that re-acquisition could occur within protocol windows. Calibration and ongoing agreement monitoring address consistency in applying semi-quantitative categories, whose boundaries can be difficult to distinguish in borderline cases. Positioning checks are complementary because analytical consensus cannot recover anatomy obscured by an inadequate projection. Re-acquisition within the allowed windows supports evaluability, while the resulting reliability estimate remains specific to the scoring framework and the examinations represented in the study.

Intrinsic Imaging’s Results

- Standardized radiographic and MRI acquisition implemented at 34 sites in 10 countries with site-level positioning feedback
- Approximately 1,400 radiographic and MRI examinations scored under validated semi-quantitative systems with independent double reads
- Inter-reader reliability for total structural score documented with an intraclass correlation above 0.90
- Unevaluable examinations held under 4% through central quality control and in-window re-acquisition

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Read the full study online: https://intrinsicimaging.com/case-studies/musculoskeletal-arthritis-phase-ii

About Intrinsic Imaging, LLC

Intrinsic Imaging is an ISO certified medical imaging CRO and imaging core lab providing comprehensive services in support of Phase I-IV clinical trials and Class I, II, III medical device trials. Intrinsic Imaging is also a world leader in conducting Artificial Intelligence studies. With its team of more than 50 board-certified and fellowship-trained physicians, Intrinsic Imaging’s team has sub-specialization in all therapeutic areas, including Cardiovascular, Central Nervous System,Gastroenterology, Musculoskeletal, Oncology and Ophthalmology. Certified by the British Standards Institution (BSI), Intrinsic Imaging is the only company in the world to hold five ISO certifications specifically for providing imaging core lab services on clinical trials. For more information, please visit www.IntrinsicImaging.com.

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