

Collaborative Care Plans Reduce Subspecialty Consults: The Experience From a Safety Net Hospital

Arshag D. Mooradian, MD; Ronald Stone, RD, MBA; Carlos Palacio, MD, MPH; and Eric Stewart, MD

The aging population and the increased prevalence of obesity are contributing to increasing numbers of patients with chronic diseases that require care by multiple specialties.^{1,2}

In one survey, approximately 40% of Americans aged between 50 and 69 years saw more than 1 physician per year.³ It is expected that the number of referrals to specialists will increase manpower needs, significantly affecting healthcare costs. Optimizing the referral process to avoid overuse or underuse of consulting services may help address this. Poor communication and lack of appropriate indication for referral may result in patient harm due to unnecessary diagnostic or therapeutic interventions.⁴ The optimal rate of referrals by primary care providers (PCPs) is unknown⁵; however, significant variability of referral rates among providers suggests that patients are inconsistently using specialist resources.⁶

Unless the severity of a problem necessitates a more urgent encounter, a patient referral to a specialist should occur within 2 weeks. After the patient is seen, consultation results should be promptly made available to the referring PCP. This process of “closing the referral loop” in large healthcare systems with complex provider networks is poor.⁷ Proposed strategies for improving referrals and communication between PCPs and specialists include involvement of specialists in active educational programs for PCPs and use of structured referral sheets.⁸ In addition, alternatives to referrals, such as an in-house second opinion, have been tried.⁸ Passive dissemination of referral guidelines alone is unlikely to lead to improvements in referral practice. Relocation of specialists into primary care sites would make consults more accessible but may not reduce outpatient visits because the demand for consults may increase with increased accessibility.⁹ The current study’s aim was to determine the effectiveness of a cluster of interventions in reducing utilization of specialist resources in a capitated health plan based in a safety net hospital. Interventions included implementation of disease-specific algorithms for referrals, training and educating of PCPs to optimize the utilization of referral guidelines, and monitoring of the appropriateness of referrals by a designated subspecialty provider. Additionally, cardiology and gastroenterology, 2 specialties with high rates of utilization, made specialized providers

ABSTRACT

Several strategies have been proposed to improve referrals and communication between primary care providers (PCPs) and specialists. In this article, we describe the effectiveness of collaborative care plans (CCPs) in reducing utilization of specialist resources in a capitated health plan based in a safety net hospital. To operationalize individual care plans, a single clinic called the Total Care Clinic (TCC) was launched. Midlevel providers were assigned to subspecialties and trained in specific algorithms of care that they were responsible for. Midlevel providers in the TCC were invited to attend in-house education opportunities. These interventions resulted in an overall 33.6-percentage-point reduction in the referral rate over 7 years of observation. The largest decrease in referrals was observed in gastroenterology, which resulted mostly from colon cancer screening with fecal immunochemical tests in place of colonoscopies. No increase in emergency department (ED) visits or hospital admissions accompanied the decreased referrals to specialists. Combining CCPs with provider education and placing select specialists in proximity of the PCPs resulted in significant referral reductions to specialists without increases in ED visits or hospital admissions.

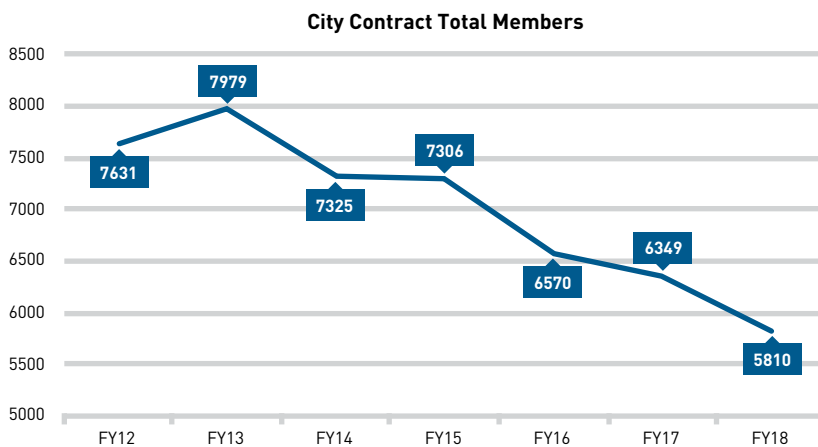
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TRENDS FROM THE FIELD

TAKEAWAY POINTS

- ▶ Improving the communication between primary care providers (PCPs) and specialists reduces unnecessary referrals and optimizes resource utilization in a managed care environment.
- ▶ We describe a model of combining collaborative care plans with provider education and placing select specialists in proximity of the PCPs.
- ▶ This model resulted in a 33.6-percentage-point reduction in referral rate over 7 years without an increase in the rate of emergency department utilization or hospital admissions.

FIGURE. Total Number Enrolled in the City Contract Plan During the Observation Period^a



FY indicates fiscal year.

^aFY12 corresponds to year 1 of the referral data collected.

available for consulting at the primary care site. These interventions, all aimed to facilitate communication among multiple providers about a patient's diagnosis and treatment, are collectively referred to as collaborative care plans (CCPs).¹⁰

METHODS

The study was conducted at the University of Florida Health Center in Jacksonville, Florida, a tertiary 695-bed safety net hospital. Administrative data of patients enrolled in a capitated plan funded by the City of Jacksonville (City Contract plan) were retrospectively reviewed. The time period of the study was 7 years (July 1, 2011, through June 30, 2018). Approval from the institutional review board was obtained. People who do not have health insurance and do not qualify for a federal health plan such as Medicare or Medicaid are eligible to enroll in the City Contract plan. Eligibility to enroll in this plan is reevaluated every 6 months except for those whose sole source of income is Social Security benefits. The latter group is eligible for a period of 1 year and constitutes a very small percentage of City Contract-eligible persons. As eligibility may change every 6 months, the population enrolled in the City Contract plan is in

near-constant flux. Given the rapid turnover of enrollees, it is thus difficult to define the demographics of the population. The variation in the number of members enrolled in the City Contract plan over the study period is shown in the [Figure](#).

The CCPs for each specialty were developed jointly by PCPs and specialists. Cardiology and gastroenterology each had an in-house specialty provider (a physician and a midlevel provider, respectively) available on-site. These in-house experts provided consultation directly to patients and were a resource for the other providers. The cardiologist spent 1 day a week in the clinic. The midlevel provider with gastroenterology had a full-time assignment at the site. The components of the CCPs are listed in [Table 1](#), and specialty specific guidelines for referrals in the CCPs are summarized in the [eAppendix](#) (available at [ajmc.com](#)).

To effectively operationalize individual care plans, a single clinic called the Total Care Clinic (TCC) was launched. The medical director appointed to this clinic worked collaboratively with the division chiefs in each specialty to coordinate care. Midlevel providers were assigned to subspecialties and trained in the specific algorithms of care they were responsible for. Faculty of each division were available to address the questions of the midlevel providers by phone or electronically. Midlevel providers

in the TCC were invited to division meetings, journal clubs, grand rounds, and other in-house education opportunities to further develop their skills in the subspecialties. A designated consultant in each subspecialty monitored the appropriateness of referrals. If a referral did not meet the prespecified criteria, timely feedback was provided to the referring provider.

Statistical comparisons of the rate of referrals in each subspecialty were carried out using a z score.¹¹ $P < .01$ was considered the level of statistical significance.

RESULTS

The number of enrollees who were referred to medical subspecialists is summarized in [Table 2](#). The total number of enrollees in the City Contract plan varied because the individuals are enrolled and leave periodically depending on their economic status ([Figure](#)). The decline in the number of enrollees was attributed to the introduction of Affordable Care Act–related health plans, with many patients electing to enroll in alternative plans.

The referral rates for the various medical subspecialists over the 7-year observation period are summarized in [Table 2](#). Year 1 is

TABLE 1. Components of the Collaborative Care Plans, by Specialty

Specialty	Referral Algorithm	Monitoring Referrals by a Specialist	On-site Specialist	Educational Opportunities for Providers
Cardiology	Yes	Yes	Yes; once a week for the first 3 years	Yes
Endocrinology	Yes	Yes	No	Yes
Gastroenterology	Yes	Yes	Yes	Yes
Hematology/oncology	No	No	No	Yes
Infectious disease	No	No	No	Yes
Nephrology	Yes	Yes	No	Yes
Pulmonary	Yes	Yes	No	Yes
Rheumatology	Yes	Yes	No	Yes

TABLE 2. Absolute Number of Referrals From PCPs to Specialists and the Rate of Referrals as Percentage of Enrollees (%) Prior to the Introduction of CCPs (year 1; baseline) and Following 6-Year Period (data shown for alternate years)

Specialty ^a	Year 1 (baseline) N = 7631	Year 3 N = 7325	Year 5 N = 6570	Year 7 N = 5810	Absolute Change (percentage points) (year 7 vs year 1)	P
Cardiology ^b	1437 (18.8%)	455 (6.2%)	692 (10.5%)	847 (14.6%)	-4.3	<.001
Endocrinology	680 (8.9%)	337 (4.6%)	208 (3.2%)	197 (3.4%)	-5.5	<.001
Gastroenterology	1912 (25.1%)	1527 (20.8%)	418 (6.4%)	185 (3.2%)	-21.9	<.001
Hematology/oncology	809 (10.6%)	781 (10.7%)	575 (8.8%)	656 (11.3%)	0.7	.204
Infectious disease	43 (0.6%)	46 (0.6%)	61 (0.9%)	34 (0.6%)	-0.0	.865
Nephrology	346 (4.5%)	392 (5.4%)	296 (4.5%)	207 (3.6%)	-1.0	.005
Pulmonary	552 (7.2%)	418 (5.7%)	297 (4.5%)	289 (5.0%)	-2.3	<.001
Rheumatology	324 (4.2%)	244 (3.3%)	253 (3.9%)	280 (4.8%)	0.6	.112
Total	6103 (80.0%)	4201 (57.4%)	2816 (42.9%)	2695 (46.4%)	-33.6	<.001

CCP indicates collaborative care plan; PCP, primary care provider.

^aN in this row represents total enrollees in the plan, not total referrals.

^bThe cardiologist assigned to the Total Care Clinic left the clinic after 3 years.

the year prior to implementation of the CCPs. Overall, the number of referrals decreased over time, and at the seventh year, there was an overall 33.6-percentage-point reduction of referrals to the medical subspecialties compared with year 1. The largest decrease in referrals (21.9-percentage-point change in the absolute rate of referrals) was observed in gastroenterology. Similarly, referral rates to endocrinology, cardiology, pulmonary, and nephrology were significantly reduced—by 5.5, 4.3, 2.3, and 1.0 percentage points, respectively ($P < .005$ for all)—whereas referrals to hematology/oncology, infectious diseases, and rheumatology were not altered significantly (Table 2). With the exception of changes in referrals to cardiology, the decline in referrals for other specialties occurred gradually. The referrals to cardiology, hematology/oncology, and rheumatology declined in the first 3 to 5 years of observation only to increase gradually over the subsequent 2 to 4 years.

During years 3, 4, 5, 6, and 7 of subspecialty data collection, there were 5025 (68.6%), 4702 (64.4%), 4488 (68.3%), 4424 (69.7%), and 3767 (64.8%) emergency department (ED) visits, respectively.

There were 978 (13.4%), 975 (13.3%), 934 (14.2%), 802 (12.6%), and 734 (12.6%) hospital admissions, respectively. The data in parentheses are the percentages of enrollees in that year. Corresponding data for ED visits and hospital admissions during years 1 and 2 were not available.

DISCUSSION

Results of this study show that CCPs incorporating referral guidelines, provider education, and selective in-house placement of specialists in services with high demand resulted in an overall 33.6-percentage-point reduction in referral rate. The largest decrease in referrals was observed in gastroenterology, which was mostly the result of preferentially offering fecal immunochemical testing (FIT) rather than colonoscopies for colon cancer screening. FIT was introduced as part of the CCPs and facilitated by educating the providers about the validity of this test in colon cancer screening through group discussions and sharing of relevant supporting literature.

TRENDS FROM THE FIELD

It is noteworthy that there were insignificant changes in the referral rates to hematology/oncology, infectious diseases, and rheumatology, as the referral guidelines for these services shared with the PCPs were the least restrictive to allow easy access for patients with ailments in the purview of these specialties.

The effectiveness of the interventions was most robust in the first 5 years of implementation of the program. Referral rates to cardiology, hematology/oncology, and rheumatology crept up in the last 2 years of observation. The transient nature of the changes in cardiology referrals was attributed to the discontinuation of the cardiology consultant after the third year of launching these collaborative plans.

It is also noteworthy that the available data for ED visits and hospital admissions during the observation period indicate that the reduction in referrals to subspecialists did not result in increased ED visits or hospital admissions.

Although the appropriate rate of referrals to various specialties is not known, there appears to be significant opportunity for healthcare cost savings. With increasing availability of specialist advice to patients and PCPs by telemedicine, email, or phone, more opportunities now exist to reduce outpatient referrals and reduce costs. It is possible that with this reduction, some patients are not receiving a referral when appropriate. This study design did not allow for assessment of the reduction in unnecessary care.

Because of their emphasis on improving quality and value of patient care, CCPs will have a pivotal role in accountable care organizations. It is noteworthy that not all CCPs are efficacious in reducing costs or improving the quality of referrals.¹² The unique approach of the present study was to incorporate several potentially useful interventions simultaneously, augmenting the benefits driven from a single intervention.

Limitations

Limitations of this study include lack of demographic data, due to high turnover of the enrollees, and lack of information about what health plans were chosen by former City Contract plan enrollees.

A newly emerging trend to improve patient access to specialists is the development of the medical neighborhood.¹³ This is an extension of the medical home that has been shown to improve the patient experience and minimize healthcare disparities.¹⁴ The medical neighborhood facilitates coordination of care between PCPs and specialists. It is considered an advanced form of collaborative care in which on-site consultants and PCPs have the opportunity to interact on a daily basis. The American College of Physicians has developed frameworks to develop these relationships.¹⁵

No single model will fit every practice. In addition, the effect of changes in referral rates on patient outcomes is uncertain. These limitations notwithstanding, it is important that PCPs continue to refer patients who need referrals.

CONCLUSIONS

Our model of combining CCPs with provider education and placing select specialists in proximity of PCPs resulted in significant reductions in referrals to specialists in a safety net hospital with limited resources. This reduction in utilization of healthcare resources did not lead to increased ED visits or hospital admissions. ■

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Author Affiliations: Department of Medicine (ADM, RS, CP) and Department of Family and Community Medicine (ES), University of Florida College of Medicine, Jacksonville, FL.

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Address Correspondence to: Arshag D. Mooradian, MD, Department of Medicine, University of Florida College of Medicine, 653-1 W 8th St, 4th Floor – LRC, Jacksonville, FL 32209. Email: arshag.mooradian@jax.ufl.edu.

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eAppendix

Guidelines for referral to Cardiology

1. Chest Pain

- Order Non-invasive testing (i.e., Stress test) - if abnormal, refer to Cardiology
- If chest pain continues – after normal stress test and maximized therapy, refer to Cardiology.

2. Murmur/Valvular Heart Disease

- Order 2D ECHO, refer to Cardiology if results show at least moderate findings (but not if mild- moderate).

3. Heart Failure (CHF)

- Order 2D ECHO, refer to Cardiology if HF due to EF <35%.
- Heart Failure with Preserved EF (no need for referral). Focus on:
 - i. Lifestyle management
 - ii. Comorbidities
 1. Obesity
 2. Hypertension

4. Arrhythmia's/Palpitations

- Refer to Cardiology for:
 - i. New onset Afib
 - ii. Prolonged QT
- Other EKG findings
 - i. Concerns for Ischemia, active clinical symptoms, send directly to ED.
 - ii. Right Bundle Branch Block – no referral
 - iii. Left Bundle Branch Block
 1. Request 2D- ECHO – if EF>40%, no further action
 2. Abnormal- <40% EF, refer to Cardiology

5. Peripheral Vascular Disease

- Claudication
 - i. Order ABI, refer to Cardiology if abnormal (<0.9)
 - ii. Normal ABI , no need for referral
- Syncope
 - i. Order Carotid US, refer if patient has abnormal results ($>50\%$ stenosis) and /or abnormal EKG (suggestive of heart block, tachyarrhythmia).

6. Hypertension

- Refer to Nephrology if resistant hypertension (or not controlled on 3 antihypertensive medications) per nephrology protocol for referrals.

7. Cardiac Clearance

- Manage Antiplatelet therapy
 - i. If > 6 months from PCI okay to stop P2Y12 inhibitor (never stop aspirin).
- Functional Capacity
 - i. If > 4 METS, patient stable, no further workup.
 - ii. If Functional Capacity cannot be assessed, order Stress Test, then refer to Cardiology.
- Patient with Valvular Heart Disease require prophylactic Antibiotics, refer to Guidelines.

Guidelines for referral to Pulmonary

1. Lung nodules:

- a. ≤ 4 mm with no risk factors (i.e. 20 pack/yr smoking, previous cancer, age >55) then no follow up CT scan or referral needed.
- b. ≤ 4 mm with risk factors follow up CT scan at 12 months if stable then no follow up needed but if increase in size refer to pulmonology.
- c. ≥ 4 mm with no risk factors no referral needed, will need follow up CT scan in 12 months and if increase in size on follow up then referral will be needed.
- d. ≥ 4 mm and any risk factors, refer for consultation, patient may be referred back to primary physician with specific details about how to follow up based on size of nodule and intervention required.

2. COPD:

- a. Only one complete PFT may be needed at time of diagnosis, subsequently spirometry yearly if needed.
- b. Referral should be made only if patient has quit smoking and continues to have symptoms or exacerbations despite being on maximal treatment (inhaled long acting beta agonist, inhaled corticosteroids, long acting anti-cholinergics, and short acting beta –agonist in combination) or has quit smoking and has more than one exacerbation/yr requiring oral steroids, antibiotics or hospitalization despite being on maximal treatment.
- c. Oxygen assessment with pulse oximetry can be performed in primary care office only if patient is able to afford oxygen therapy since city contract does not cover DME. Oxygen therapy should be instituted only if pulse oximetry shows oxygen levels of 89% or less at rest or with activity.
- d. Patient should not be referred solely for the purpose of getting medication assistance approved since Shands pharmacy can assist with that.

3. Asthma:

- a. Referral to be made if asthma is not well controlled (i.e. symptoms > 2 days/week, night time awakening from asthma 3-4/month, using short acting beta agonist > 2 days/week, minor limitation with normal activity) despite being on inhaled corticosteroids and patient does not smoke.

4. Sleep Apnea:

- a. Referral for sleep study only if patient able to afford DME required to treat sleep apnea (CPAP/BiPAP) since city contract does not cover DME.

Guidelines for referral to Endocrinology

1. Diabetes mellitus

Consults will be evaluated for Hgba1c over 8.5% and/or frequent episodes of hypoglycemia

2. Hypothyroidism

Consults after unsuccessful trial of thyroid hormone replacement and titration with the exception of pregnant women who should be referred urgently after phone communication to the consultant.

3. Hyperthyroidism

Consults after thyroid uptake and scan obtained with the exception of pregnant women who should be referred urgently after phone communication to the consultant.

4. Thyroid nodule

Nodules larger than one cm by ultrasound criteria should be sent to radiology for fine needle aspiration. If biopsy is suspicious or cancerous, refer to endocrinology.

5. Osteoporosis

Consults for patients with fractures from falls less than standing height and bone density test obtained.

6. Hypercalcemia

Consults for patients with calcium over 10.5. Parathyroid hormone levels and 24 hour urine calcium excretion should be ordered first.

7. Adrenal mass

Consults after 24 hour urine metanephrines and creatinine are available.

8. Male hypogonadism

Consults for men if testosterone less than 200 in an early morning sample.

Guideline for referral to Gastroenterology

1. Screening for colorectal cancer

- a) Annual fecal occult blood testing (FOBT) X 3
- b) If positive, screening colonoscopy suggested

2. Gastroesophageal reflux disease (GERD) with or without dysphagia

- a) Trial of double dose PPI therapy for 8 weeks
- b) Barium swallow
- c) If refractory, GI referral

3. Inflammatory Bowel Disease (ulcerative colitis and Crohn's disease)

- a) Once diagnosis made, referral to GI for confirmed diagnosis and management

4. Hepatitis C

- a) Serological antibody testing, genotyping and RNA titer
- b) Exclude major depression and alcohol abuse (need to be abstinent for at least 6 months)
- c) Patient wishes to be treated with antiviral therapy, GI referral

5. Non acute gastrointestinal bleeding (melena, hematochezia)

- a) Serum hemoglobin and FOBT.
- b) If confirmed, GI referral within *48 hours* if signs of active bleeding and within *1 week* if clinically stable.

Guideline for referral to Hematology and Oncology

- a) Any patient with suspected hematologic disease for diagnostic work up or known disease requiring long term treatment.
- b) Any patient with diagnosed oncologic disease.

Guideline for referral to Infectious Diseases

- a) Any patient with suspected infectious diseases for diagnostic work up

- b) Known cases of AIDS, tuberculosis or any infections requiring long term antibiotic or antiviral therapy.

Guidelines for referrals to Nephrology

1. Patients with **newly recognized renal failure** not due to obvious factors such as volume depletion, new medications or urinary tract obstruction, and patients with rapidly deteriorating renal function, should be referred.
2. Patients with **hematuria** should be referred after structural lesions have been ruled out.
3. Patients with **more than 0.5g protein/g. creatinine in a random urine** sample should be referred, unless known to be due to diabetes and already on appropriate treatment with ACEI or ARB medication, BP controlled and blood glucose and lipids treated. Referral of the latter patients should be made however, for uncontrolled worsening of proteinuria beyond 1.5 g/g creatinine.
4. Patients with **chronic kidney disease** should be managed or referred as follows:
 - a) EGFR (estimated GFR) > 60 ml/min/1.73 m²: Treat comorbid conditions, intervene to slow progression of kidney disease, and take measures to reduce the risk for CVD.
 - b) EGFR 30- 60 ml/min/1.73 m²: Evaluate and treat complications of decreased GFR, such as anemia, malnutrition, bone disease, neuropathy, and decreased quality of life. Referral to Nephrology may be needed at this stage when the primary care clinic is unable to manage these complications.
 - c) EGFR < 30 ml/min/1.73 m²: Referral to Nephrology required here for further evaluation and management, including preparation for kidney replacement therapy.
5. **Hypertension**: Refer patients with resistant hypertension (or not controlled on 3 antihypertensive medications).

Guideline for referral to Rheumatology

1. Early inflammatory arthritis.

- a) Suggested workup prior to consultation: Comprehensive metabolic profile, CBC, Urinalysis, ESR, CRP, ANA, SSA, SSB, RF, CCP Antibodies and uric acid.
- b) Patients with active synovitis should be referred promptly for further management

- c) Refer to Rheumatology for further management If diagnosis of Rheumatoid arthritis, spondyloarthritis such as ankylosing spondylitis, psoriatic arthritis, reactive arthritis, inflammatory bowel disease related arthritis is known.

2. Connective tissue disease (CTD) e.g. SLE, Sjogrens, Scleroderma, Myositis.

- a) Consult rheumatology for diagnosis and management of suspected CTD

3. Low back pain

- a) Manage conservatively in the absence of red flag symptoms (night pain, urinary or fecal incontinence, neurological deficit and constitutional symptoms)
- b) In the presence of early morning stiffness of greater than 1 hour, consider AP pelvis. If sacroiliitis is detected, consult Rheumatology

4. Osteoarthritis

- a) Treat with Tylenol, heat and icing as first line therapies.
- b) If no contraindications, consider NSAIDs in symptomatic patients. Consider concurrent proton pump inhibitor use in high risk patients. Check BUN, Creatine, AST,ALT, ALB, HCT, HB on a six monthly basis.
- c) Consider local injections for monarticular symptoms
- d) Refer to rheumatology if co-existing inflammatory or crystalline arthropathy is suspected or if OA is seen in younger patients eg age less than 40 years.

5. Fibromyalgia Syndrome

- a) Clinical and laboratory evaluation suggested to exclude underlying medical problems such as hypothyroidism, chronic hepatitis C or co-existing rheumatic disease.
- b) De-emphasize pharmacological intervention. Emphasize sleep hygiene, graduated aerobic conditioning.
- c) Consider use of SNRIs such as Effexor, and in selected individuals, tricyclic antidepressants at night.
- d) Consider trial of gabapentin or pregabalin.
- e) Refer to Rheumatology if underlying rheumatic disease such as lupus, spondyloarthropathy suspected.