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# SSc management – In person appointments and remote therapy (SMART): A framework for management of chronic hand conditions

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ABSTRACT

The changing health care climate poses unique challenges to managing a chronic and progressive disease like systemic sclerosis (SSc). At our institution, we employ a new model for SSc management that combines "in person" appointments and "remote" therapy (SMART). This program fosters an understanding of the disease process with the goal of improving skills and confidence for self-management and empowering individuals by providing a means of daily self-assessment. Technology is utilized as a means to remotely monitor and assess progress. We present our approach as a framework for long term management of chronic hand conditions. Evidence from a variety of disciplines is cited to support the design and parameters of this model.



## Introduction

The treatment of chronic musculoskeletal conditions poses multiple challenges to health care practitioners and patients. The current health care climate compounds these challenges by providing limited reimbursement for therapy services. Treatment of these conditions is fundamentally different than an acute injury and demands long term re-assessment and treatment. Due to the chronicity, the polyarticular nature, and systemic involvement of the disease, the traditional hand therapy paradigm of short term, focused, regular sessions is neither feasible nor effective, thereby demanding a reconceptualization of rehabilitation services to optimize resources. A paradigm shift is required to move the locus of control from the clinic to the home and transfer the rehabilitation responsibility from supervised therapy to a self-monitored program.

At our institution, The Hospital for Special Surgery, we have the opportunity to treat a large number of patients with systemic sclerosis (SSc). Therapists work closely with physicians and health professionals at the Scleroderma, Myositis, and Vasculitis Center to provide both clinical care and an infrastructure for basic, translational and clinical research. We developed The SMART framework to effectively enlist the patient as the "home therapist," fully accountable for managing the disease and permitting the therapist to serve as consultant and coach. With fewer therapy visits invested on the front end, resources are allocated over time to allow for a long term relationship and oversight of care. This systematic approach to the therapeutic management of SSc is based on a thorough review of current evidence and best practice. SMART is a practical framework for treatment integrating traditional hand therapy "in person" appointments and "remote management" in a hybrid fashion (see Fig. 1 for a schematic representation of this approach). Both of these components are crucial to the success of the program. The "in person" component (IPc) is essential to tailoring the program to the individual needs of each patient by taking into account the wide variations and complex ranges of disease presentation. The "remote management" component (RMc) carefully monitors this individualized plan while creatively solving the problem of both decreased access to care and chronicity of illness, successfully shifting the in-person appointment experience to a self-management perspective.

The SMART framework also addresses the challenge of treatment program compliance which is particularly difficult, yet imperative in the face of chronic illness. Successful attempts to improve adherence have been studied and documented extensively.[1] Martin et al suggests three categories of contributing factors: clear and effective *communication* between the health care provider and the patient, realistic assessment of patient's

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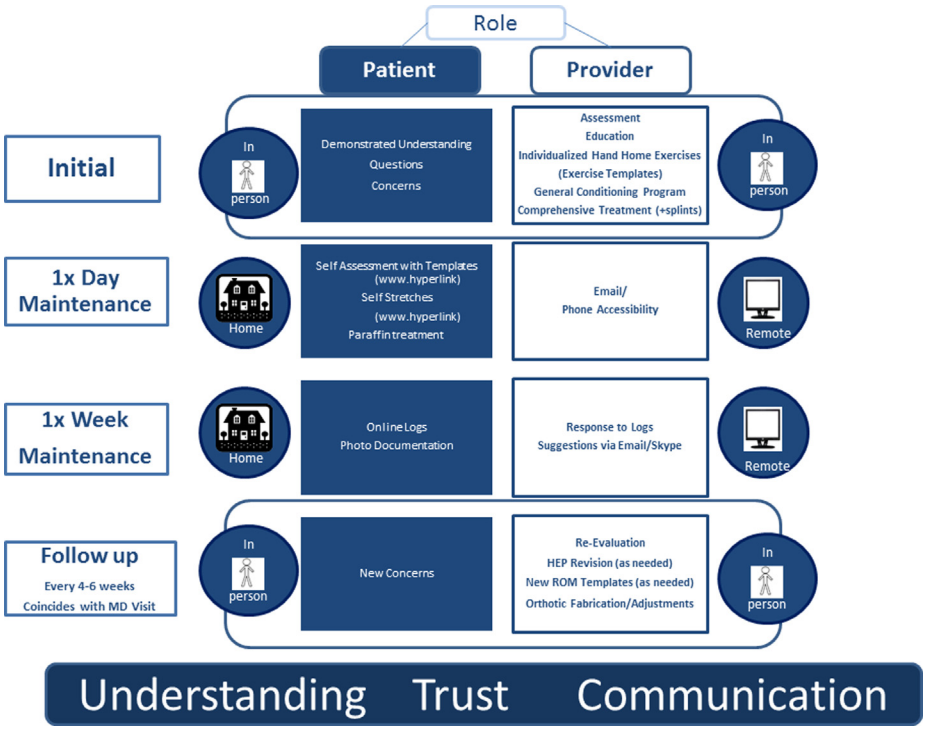



**Fig. 1.** Schematic framework for treatment.

*understanding* and knowledge, and a *trusting* relationship between provider and patient.[1] Based on these premises, we designed and implemented our model that rests on 3 foundational values: understanding, trust, and communication (Fig. 1). The program is designed to empower patients with knowledge and understanding, and provide them with a custom designed practical approach to manage and control hand impairment using readily available technology to facilitate the process.

## Application of the SMART framework to management of SSc

Systemic sclerosis (SSc) is a chronic autoimmune condition of uncertain etiology characterized by vasculopathy and fibrosis of the skin and internal organs.[2] Hand impairment is a major cause of morbidity and disability in this patient population[3] and is characterized by the interplay of several factors. Fibrosis of the skin and underlying tendons can lead to contracture of the fingers. Inflammatory arthritis is also frequently present, accompanied by joint pain and swelling. Additionally, vasculopathy leads to ischemic damage of the fingers with the development of digital ulceration and poor wound healing when trauma occurs. All of these factors lead to decreased range of motion and decreased function of the hand.[4] The presence of joint pain, tendon friction rubs, and contractures predicts significantly higher disability indices.[5] Medical treatments address specific issues in SSc, but there is presently no satisfactory disease-modifying agent to reverse the overall condition. Studies addressing individual treatment and group interventions have been reported[5–8] as well as educational programs designed to address patient understanding and group support.[9,10] Additionally, recent studies examine the efficacy of Internet education modules in a population with SSc.[11,12] However, no systematic approach *encompasses* and *combines* both "in-person management" and "remote management" to meet patients' needs by accommodating for limited health care accessibility and reimbursement as well as the chronicity of the disease.

The SMART framework is an attempt to address the global rehabilitation needs of an SSc patient. Below, we present each component of the SMART framework. These components are not sequential and often overlap. Each component is first described and then followed by evidence from a variety of disciplines to support the parameters and design. Previously reported effective treatment methods are integrated into this approach with additional novel and innovative ideas that utilize current technologic advances.

## "In person" component (IPc)

The IPc consists of both an initial phase and follow up visits. The initial IPc may last anywhere from one session to 1–2 sessions weekly over a period of a month to 6 weeks. The length of the IPc will be dictated by the extent of the disease and level of impairment as well as feasibility factors such as proximity to services and health insurance coverage. Ideally, the initial IPc should be performed over several sessions, however, in individual cases one session may be all that is required or feasible. Additionally, these sessions are best performed in a quiet and undisturbed environment with enough time allotted to devote to multiple issues. The goals during the initial IPc are: 1) To provide information and understanding of the nature of the disease process and progression with particular attention to the hand. 2) To optimize the available skin and soft tissue mobility via manual therapeutic techniques. 3) To provide a simple and manageable home program that utilizes visual feedback methods for accurate self-assessment of progress.

The initial IPc is comprised of 5 components:

1. Assessment
2. Education
3. Individualized Hand Home Exercise Program – development and provision
4. General Conditioning Program – development and provision

**Table 1**
Validated outcomes for use in SSc

| Tool | Measures | Characteristics |
|---|---|---|
| Cochin Hand Function Scale (CHFS)[17] | Self report scale of hand function | 18 tasks with 5 subscales (kitchen, dressing, hygiene, office and other) |
| Health Assessment Questionnaire Disability Index (HAQ-DI)[19] | Disability level | 20 items, 8 domains: dressing, grooming, arising, eating, walking hygiene |
| Hand Mobility in Scleroderma (HAMIS)[14] | Hand function | 9 items, clinical movement assessment: digit flex/ext/abd, thumb abd pinch, wrist flex/ext, Forearm pro/sup |
| Modified Rodnan Skin thickness Score (mRSS)[15] | Skin mobility | Clinical palpation of 17 body areas |
| Scleroderma Functional Assessment Questionnaire (SFAQ)[16] | Function | 11 items, 9 upper extremity function, 2 muscle weakness |
| Short Form – 36 (SF-36)[18] | Quality of Life | 36 items measure health on 8 dimensions: general health perception, physical and social functioning, role limitations, mental health, vitality, body pain |

5. Comprehensive Treatment – maximization of soft tissue mobility, range of motion and function including provision of orthoses and adaptive devices

## Assessment

The initial IPc begins with a first visit during which a comprehensive therapy evaluation of skin and soft tissue mobility, hand function, and available range of motion is performed. Results of the assessment are used to develop the individualized home treatment plan including exercise templates.

### *Supporting evidence*

The Hand Mobility in SSc (HAMIS)[13] is a validated and reliable hand function test for SSc patients which assesses the movements included in an ordinary ROM examination (Table 1). Other important assessments for this population include: measurement of hand span, and finger to palm distance, the angle of contracture of the PIP joints, digital ulcer counts, presence of tendon friction rubs in the hands and wrists, skin thickness using the modified Rodnan Skin thickness Score (mRSS),[14] and a standardized self-reported functional assessment such as the SSc Functional Assessment Questionnaire (SFAQ),[15] or the Cochin Hand Function Scale (CHFS).[16] The SF-36[17] and the Health Assessment Questionnaire Disability Index (HAQ-DI)[18] are other important assessments frequently performed in SSc research studies. For additional details of these SSc specific outcome measures see Table 2.

## Patient education

Education is a fundamental component of the program designed to increase understanding and develop confidence for home management. On the first visit, a graphic representation of the framework (Fig. 1) is provided to the patient in digital or paper form as a contract of sorts and the overall approach is discussed (An advantage of providing a digital form is that a hyperlink is embedded in the graphic that links to the individualized home exercise program described below.). All instructional material is developed to take into account the health literacy level and cognitive processing factors of the individual. All information and instruction regarding the progression and management of the disease is provided in *lay language*. Verbal and written information is supplied on preventive strategies for hand impairment as well as ulcer prevention, basic wound care management, warning signs of infection, and vascular compromise. In order to ensure comprehension and understanding it is of utmost importance to avoid overloading the patient with information. In a clinic situation, recall and retention is further exacerbated by other factors such anxiety, fear, and pain. This is particularly relevant when treating a patient with a newly diagnosed chronic condition. Written text is designed to account for factors that impact learning. Effective material allows the reader to focus on the message and reduces the resources required to process the extraneous elements such as design and organization of the material. Practical suggestions may include: using repetition, limiting the quantity of material to important key points, and spacing new information over several sessions. Practical examples include using clear and simple font, maximizing white space and avoiding clutter, avoiding technical jargon, and only using graphics when necessary (Fig. 5). The goal of these educational materials is to impart knowledge to patients with the intent that fostering this knowledge will engender confidence and the ability to self-manage. Providing clearly written information with visual aids for later review is beneficial, as well as asking questions and fostering discussion to ensure understanding.

### *Supporting evidence*

Capacity for working memory is generally limited to seven items.[19] That information is quickly forgotten unless it is moved into long term memory or storage. Given the large amount of information that is imparted in a brief amount of time, it is likely that patient's short term memory capacity is exceeded. A study by Sandberg et al[20] examined deficits in retention for verbally presented medical information in a group of subjects who received simulated preoperative anesthesia options and instructions. Subjects were asked to engage in free and cued recall of information presented in a video, and to complete a recognition task. Subjects were only able to recall 25% of the information presented spontaneously. When provided with retrieval cues recall increased to 67%.

**Table 2**
Clinical studies of hand exercise programs in systemic sclerosis

| Study | Design | Intervention | Outcome measures | Follow up | Results |
|---|---|---|---|---|---|
| Bongi[9] | RCT | Connective tissue massage<br>McMennell joint manipulation | Fist closure<br>CHFS<br>HAMIS<br>HAQ | 9 weeks | Increased composite flexion<br>Increased motion<br>Increased hand function |
| Mugii[11] | Cohort study | Finger stretches | Composite flexion<br>HAQ | 1 year | Increased composite flexion<br>Improved function |
| Sandqvist[10] | RCT | Paraffin, hand exercises | ROM, Grip, mRSS, VAS, ADL Questionnaire | 1 month | Increased mobility, increased function |

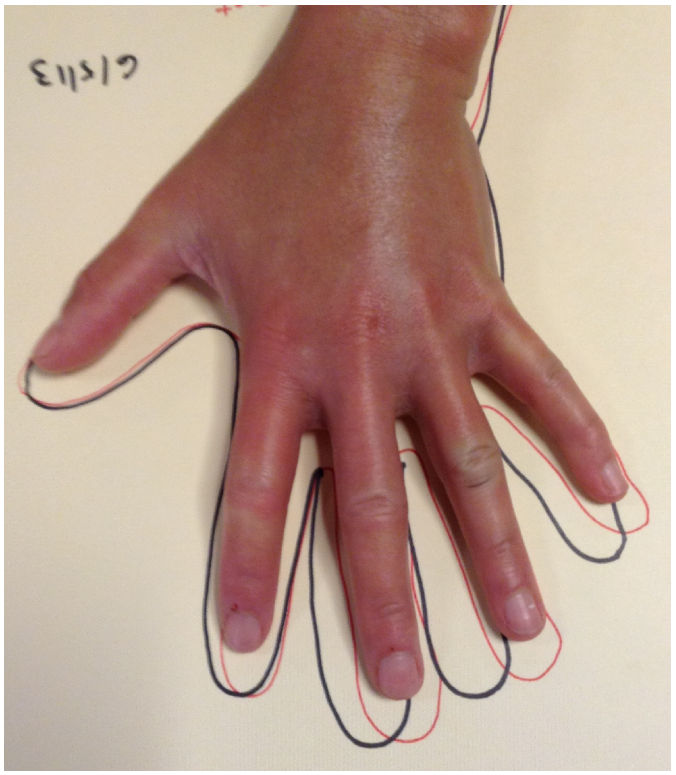


**Fig. 2.** Digit abduction with template.

Wilson[21] describes "Best Practices" for the development of printed health material that has been selected for optimal comprehension and recall. Organization of instructions in list format has been found to increase understanding and memory in patients with heart failure and older adults. Simplification of the material and how the message is worded also affects how well the information is remembered and understood.[22] Simplification of text has been correlated with better comprehension and retention.[21] Consideration is also given to the color of the text, the color of the background and avoidance of extraneous written and visual/graphic information.[23] Additionally, multi modal imparting of information via verbal, visual, and written mediums reinforces understanding.[24] It has also been suggested that the medium through which information is given influences comprehension and memory. According to Mayer's multimedia learning theory working memory has multiple and distinct storage areas for information presented via different modalities. The dual channel principle, a component of the theory, proposes that visual and auditory information is processed through different channels, thus strengthening and augmenting learning. Multimedia material can also be adapted to limit extraneous processing by eliminating superfluous material, highlighting essential information, and placing printed words near corresponding graphics.[25]

**Fig. 3.** Digit extension with template.

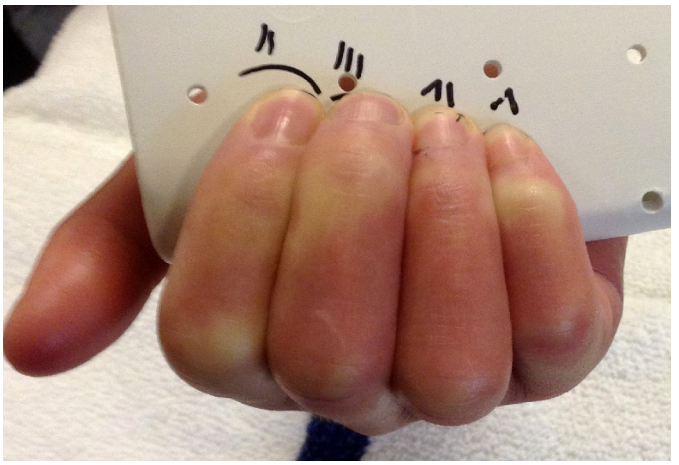


**Fig. 4.** Digit flexion with template.

## Individualized Hand Home Exercise Program

Strategies to maximize comprehension are employed when establishing a home program. A core principle of the program is to provide the patient with a method to self-monitor range of motion daily. Custom fabricated templates for wrist flexion/extension, digit abduction, and digit flexion and extension as described by Melvin,[26] along with instructions to stretch to the limits of each template, provide patients with a visual goal as a means for self-assessment (Figs. 2–4). Templates are fabricated from durable material such

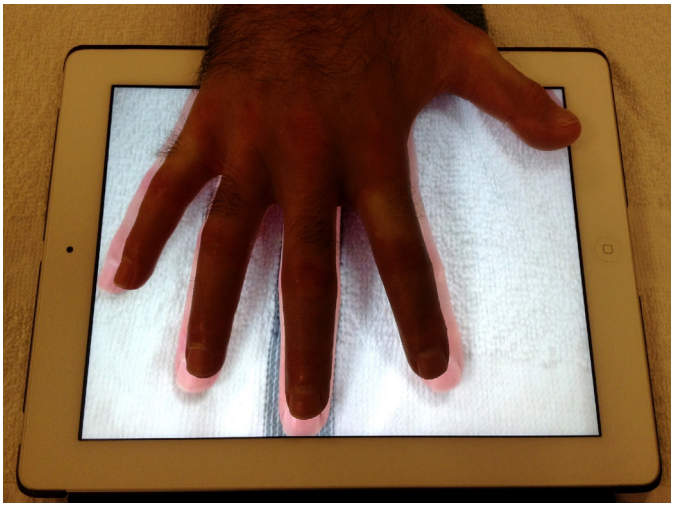
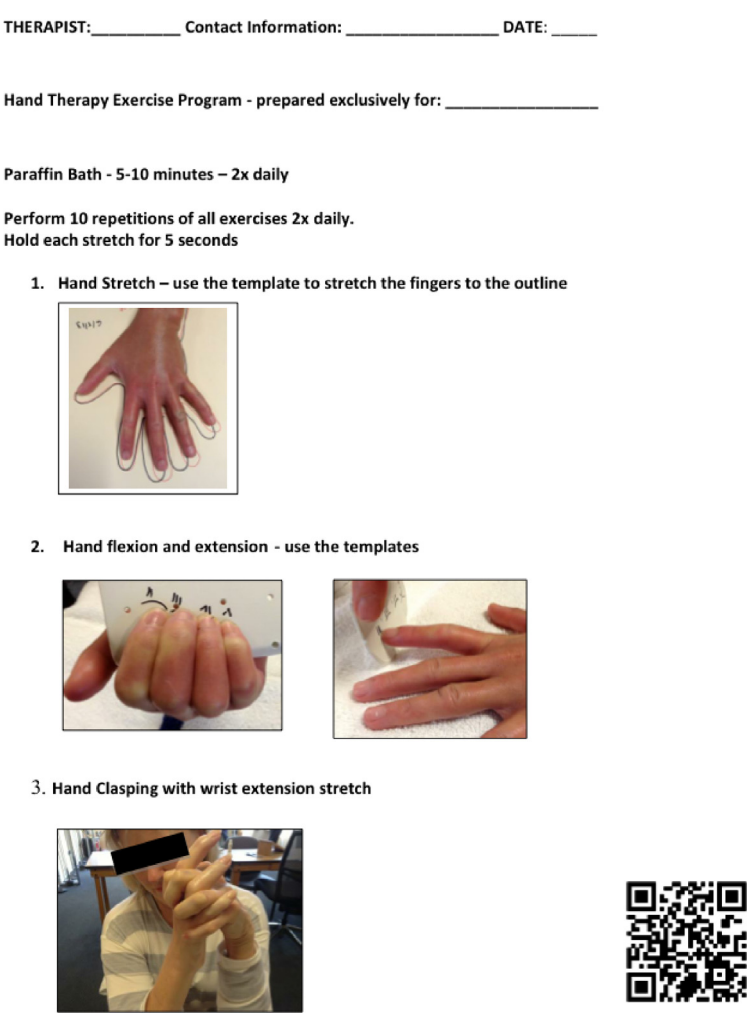


**Fig. 5.** Digit abduction using photo template on iPad.


THERAPIST:_____ Contact Information: _____ DATE: _____

Hand Therapy Exercise Program - prepared exclusively for: _____

Paraffin Bath - 5-10 minutes – 2x daily

Perform 10 repetitions of all exercises 2x daily.
Hold each stretch for 5 seconds

1. Hand Stretch – use the template to stretch the fingers to the outline

2. Hand flexion and extension - use the templates

3. Hand Clasping with wrist extension stretch

**Fig. 6.** Sample home program with QR code.

as orthotic scraps or cardboard for the most limited digit motions, usually digit abduction, extension and flexion (Figs. 2–4). An alternative to templates is to photograph the patient's hand in the maximum range position and scale to real size. The photograph can be printed or stored on a computer or iPad and used as a virtual template to track progress (Fig. 5). Likewise, still and moving images to further assist with understanding are provided and inserted into the custom home program (Fig. 6). Another option is to embed a Quick Response (QR) code into the home program document (Fig. 6). A QR code is a matrix bar code scanned via a free downloadable QR reader available for smartphones. This allows the patient to access all home programs easily on a smartphone.

The comprehensive home program for self-stretching is issued to maintain maximum finger, hand, wrist and forearm range of motion, however, to ensure compliance the number of exercises is kept to a minimum. Similarly, stretching exercises are limited to a frequency of once daily. Our experience as well as reported evidence regarding exercise parameters, suggests that a maximum of four to five exercises is an optimal number to ensure compliance.

*Supporting evidence*

The ability to self-monitor range of motion is important for two reasons. First, it attempts to prevent the slow progression of loss of motion that is difficult to notice due to the insidious nature of the disease.[26] Second, it empowers, the individual to take ownership and increases confidence. This idea is supported by studies that report that self-monitoring of physical activity improved self-efficacy (the ability to complete tasks and reach goals) and behavior in people with type 2 diabetes.[27] Additionally, the relationship between self-efficacy and self-regulation has been widely studied in physical activity behavior and has been found to increase adherence to exercise in older adults.[28] Both decreased duration and decreased frequency of exercise programs has also been associated with increased compliance and performance in older adults.[29,30]

Clinical studies evaluating the effectiveness of hand therapy in SSc have shown clear benefit[5] (Table 1). Bongi et al showed benefit to a global rehabilitation technique in a small group of patients.[6] A study of a home exercise program was performed by Mugii et al and demonstrated efficacy of a self-administered stretching program for individual digits.[31] A series of 3 stretching exercises were performed for each finger. Composite flexion scores improved after 1 month of daily intervention as did HAQ scores. Both of these improvements were sustained for a year post intervention.[31]

## General Conditioning Program

The fourth component of the IPc phase is provision of guidelines for general exercise and conditioning program. Because of the systemic involvement of the disease process this program must be developed in collaboration with the treating rheumatologist and

cleared by the pulmonologist and cardiologist if warranted. Currently, there are no specific parameters or guidelines for optimal exercise dosage, duration or intensity for SSc, despite the collective literature supporting both aerobic and strength training. The available evidence points to the benefits of exercise outweighing any adverse response. In the absence of firm parameters conditioning and general exercise guidelines are provided on a case by case basis with input from the treating physicians.

*Supporting evidence*

Evidence of the systemic benefits of exercise on health are well documented in chronic autoimmune disease,[32] however the sustained inflammatory condition that is present poses particular challenges with respect to exercise and activity due to the systemic and pervasive nature that is characteristic of the disease. This includes associated cardiac disease, lung disease, pulmonary hypertension, arthritis and myositis as well as common symptoms of joint and muscle pain, fatigue, decreased lung capacity, and muscular weakness.[32] In the past, these indications have led health care professionals to believe that exercise be restricted in this population for fear of exacerbating inflammation, and other symptoms, and therefore, been limited to gentle stretching, gentle strengthening, and massage. This belief is currently being challenged, based on evidence in the last decade that demonstrates the role of exercise in reducing cellular and systemic inflammation, and the effects of physical activity in improving physical performance and cardiorespiratory fitness in individuals with diabetes, chronic cardiac and respiratory diseases, and rheumatic autoimmune diseases.[32,33] A comprehensive review by Alexanderson[34] includes studies between 1993 and 2007 documenting the safety and efficacy of exercise in individuals with polymyositis and dermatomyositis. Following exercise, patients demonstrated an increase in type 1 oxygen dependent muscle fibers, increased muscle endurance, decreased disease symptoms, and decreased muscle inflammation.[34] A recent longitudinal study by Nader et al that examined the effects of a strength training program in individuals with polymyositis and dermatomyositis, demonstrated an inhibition in inflammation signaling pathways, and a reduction in gene expression related to inflammatory processes, supporting the premise that exercise has beneficial effects on the cellular inflammatory level.[33] In SSc both systemic and local inflammation is evidenced by high levels of inflammatory cytokines associated with disease severity. As such, the SSc population would likely demonstrate similar anti-inflammatory benefits in response to exercise as those observed in other clinical populations.

Rheumatoid arthritis (RA) is the most commonly studied autoimmune rheumatic disease in the context of exercise and the benefits of moderate and high intensity exercise on fatigue, muscle strength, aerobic capacity, and pain is well documented.[35] A 2009 Cochrane Review by Hurkmans et al included 8 studies that assessed both short term (less than 3 months) and long term exercise programs (more than 3 months) and aerobic capacity and muscle strength training. Long term, aerobic capacity and muscle training demonstrated modest positive effect on functional ability and aerobic capacity with no reported negative effects. Based on the evidence reviewed, the authors conclude that aerobic capacity training combined with muscle strength training is recommended as routine and safe practice in patients with RA.[36] Similarly, recent studies examining the effects of both aerobic and strength training in systemic lupus erythematosus (SLE) indicate that exercise training is safe and effective in improving fatigue, depression, and aerobic capacity in patients with SLE.[37,38] Recently, two studies reported results to support both safe aerobic and resistance exercise programs for patients with SSc.[39,40] The first study conducted over an 8-week program, evaluated tolerance to aerobic exercise by measuring aerobic capacity and oxygen saturation. Subjects underwent a 40 min moderate aerobic exercise session (70% $VO_2$ max), twice a week. The treadmill walking program included a 5 min warm up phase with a progressive increase in speed until target heart rate was achieved. Target heart rate was maintained for 30 min, followed by a 5 min cool down period. All subjects improved peak exercise oxygen saturation and peak oxygen consumption, and were able to perform exercise at a higher intensity as measured by blood lactate levels.[39] A second study evaluated the effects of a 12 week combined aerobic and resistance training program. Subjects performed 5 min of treadmill warm-up followed by 30 min of resistance training, 20 min of aerobic treadmill training, and a 5 min stretching program. The resistance training included a total of 5 exercises, one for each of the main muscle groups: bench press, leg press, lat pull down, leg extension, and a seated row. Following the training period, subjects exhibited improvement in upper and lower body strength with no change in serum markers of muscle damage.[40] Compared to the aerobic training group, the combined training group demonstrated lower aerobic benefits. Most importantly, no increase in negative symptoms was noted in either study, negating previous findings of exercise intolerance and supporting the idea that improvement in aerobic capacity is feasible in patients with SSc.[39,40]

## Comprehensive Treatment

The fifth component of IPc, the initial treatment phase, is most similar to traditional therapy sessions where the patient is introduced to the benefits of paraffin and instructed in purchasing for home use. Manual soft tissue techniques are employed to maximize soft tissue and joint mobility. During this phase orthotic and adaptive equipment needs are addressed.

*Supporting evidence*

The benefits for use of paraffin wax in SSc patients is well documented.[8,41,42] Several studies report significant improvement in both skin stiffness and joint motion including a high-level randomized control trial by Pils et al where improvements in motion were maintained in the paraffin group, but not in controls.[42] A study by Sandqvist examined the benefits of paraffin in one hand compared to the other. One hand received paraffin and exercise, and the other exercise alone. The hand treated with paraffin demonstrated significant increased skin elasticity and increased digit range of motion.[8] Bongi et al performed a randomized controlled trial to study the effects of connective tissue massage and a specialized technique, McMennell joint manipulation, in a cohort of forty subjects with SSc. Fist closure and functional impairment scores (CHFS, HAMIS, and HAQ) improved in the interventional group demonstrating both improved joint motion and hand function.[6]

## Follow-up

Ideally, follow up, in-person sessions to re-evaluate and assess status should be performed every 4–6 weeks. During these visits adjustments and revisions are made to the home program based on re-evaluation of soft tissue mobility and range of motion. Often changes in the condition of the skin, joints, and soft tissue require significant adaptations and revisions to the home program, including fabrication of new exercise templates. Orthoses are modified to the patient's changing needs and adaptive equipment needs are re-assessed with the recommendations for new devices or modifications of existing devices being made. Compliance and adherence to home treatment is also assessed at this time using

self-reported measures such as questionnaires and logs that have been used to assess compliance with home exercise.[43]

### "Remote management" component (RMc)

The remote phase can either follow or overlap with the initial phase and is comprised of the following components.

### Daily maintenance: self assessment with templates

Self assessment is performed by the patient on a daily basis using the custom templates (physical or digital) provided during the initial IPc. The templates provide the visual feedback necessary to achieve maximal stretch.

### Daily maintenance: self stretches

The individualized program is accessed by the patient digitally (or on paper) and typically is limited to 4 or 5 exercises to maximize compliance. These exercises are performed once or twice daily. Patients are encouraged to perform exercises 5 days a week, allowing for a "weekend" off.

### Daily maintenance: paraffin treatment

Patients are provided with instruction on home paraffin use, once or twice daily, and preferably prior to stretches. Reasonable home paraffin units are available from online retailers and drug stores.

### Weekly maintenance: online logs

Patients are performing the Individualized Hand Home Exercise Program and General Conditioning Program at home but are logging their performance using available technology while the therapist monitors the patient's execution of the self management in real time. A practical approach is to have patients complete an online log on a spreadsheet via Google Docs (Google, Mountain View, CA) that allows the therapist to track performance. This allows for consistent monitoring and coaching or adjusting as needed. While logs are completed by the patient on a daily basis, a weekly or biweekly "check" is performed by the therapist. A contributing factor to establishing a collaborative and trusting relationship is continuous accessibility to care. In the time between monthly visits, access is provided via email and telephone correspondence that allows for questions and consultation regarding changes in functional and physical status and adaptation of activities and exercises.

### Weekly maintenance: photo documentation

Many patients find it helpful to clarify a changing condition by sending photos and/or video images via email. At any time, if there is a concern regarding skin integrity, circulation, or infection an immediate referral to the physician is indicated. Likewise, additional therapy visits are scheduled if necessary.

*Supporting evidence*

Internet based education programs have recently been found to increase health efficacy and improve knowledge, skills and confidence in managing SSc and other chronic arthritic conditions.[11] A recent pilot study by Poole examined the effects of an Internet self management program that included downloadable education modules, an interactive discussion board and learning activities. The results of the pilot support a remote delivery system and report a positive effect on management of care, depression and fatigue. While these studies examined the effect of remote delivery of information based programs, we propose an interactive model for remote management that includes monitoring and coaching in an effort to improve hand function. Feasibility studies and efficacy studies of interactive voice and video telehealth models such as Skype™ (Microsoft, Redmond, WA) or Facetime (Apple Inc, Cupetino, CA) have been recently reported in the mental health and gerontology literature with positive outcomes. A recent study examining the utility of realtime telehealth for self management in chronic obstructive pulmonary disease concluded that interactive video instruction is feasible and effective in decreasing dyspnea in this population.[44] While interactive video instruction poses logistical, billing and privacy challenges, this is a feasible option for remote management of SSc that will likely become more available and easier to implement in the near future.

## Summary

Trust in the provider/patient relationship has been shown to increase adherence to treatment care by three times the rate, and thus has a significant effect on outcomes.[1] The SMART framework suggested here for the treatment of chronic hand impairment is based on the development of this relationship by investing in the education aspect early on. Empowering the patient with knowledge and understanding, while providing a method for daily self-assessment aims to successfully prevent progression of functional impairment. Providing patients with education that is based on cognitive learning principles and health literacy studies maximizes comprehension and compliance. Continued monitoring frequently via utilization of technology and less frequently/as needed via in-person therapy visits allows for increased utilization of health care resources while continuing to provide optimum care. While this program was developed specifically for this population, it can be easily modified and applied for other chronic hand and upper extremity conditions such as rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), and myasthenia gravis. Generalizing the SMART framework to other chronic or progressive chronic hand conditions may lead to more effective management and greater optimization of resources. It is our intention to further study the SMART framework and measure its effect on hand function and overall management of chronic diseases.

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# JHT Read for Credit
## Quiz: #309

**Record your answers on the Return Answer Form found on the tear-out coupon at the back of this issue or to complete online and use a credit card, go to *JHTReadforCredit.com*. There is only one best answer for each question.**

#1. The following are common manifestations of SSc
   a. increased collagen deposition
   b. vascular involvement
   c. progressive diminution of hand function
   d. all of the above

#2. The SMART approach to managing hand issues in the SSc patient combines
   a. individual visits to a hand therapist and group therapy sessions
   b. medical management (drugs) and intense hand therapy sessions
   c. in person and remote patient management
   d. a comprehensive home program and home care via a visiting hand therapist

#3. A central theme to the SMART approach for the SSC patient is
   a. educating the patient on the disease process and its manifestations
   b. frequent face-to-face monitoring sessions by the hand therapist
   c. limiting the cost of therapy by obtaining prior approval from the insurance carrier
   d. certifying the hand therapist to perform periodic injections of corticosteroids

#4. A key management goal is to
   a. train the therapy staff to “share the responsibility” for the patient
   b. enlist the patient as the “home therapist”
   c. enlist a caregiver as the “home therapist”
   d. establish a “telephone tree” which includes the hand therapist’s cell phone number

#5. The SMART process may only be utilized for the SSc patient population
   a. true
   b. false

When submitting to the HTCC for re-certification, please batch your JHT RFC certificates in groups of 3 or more to get full credit.