
EDUCATIONAL RESEARCH IN ACTION

Establishing a residency program for a chiropractic specialty in a public hospital system: Experiences from Denmark

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Objective: We describe the experiences and lessons learned from establishing a 5-year postgraduate hospital-based residency program for chiropractors in Denmark. The program was established with the aim of qualifying those chiropractors to undertake common and several specialized functions in relation to musculoskeletal disorders, at the highest professional level, within the particular conditions of a hospital setting.

Methods: We provide an overall description of this unique program, examples of specific educational goals, and the process used to develop the program.

Results: Three pilot programs were conducted between 2009 and 2016. The internship program and educational goals were revised extensively during this period. Between revisions and semistructured interviews with key medical officers following the pilot program, the program was well received and considered appropriate for further qualifying chiropractors for specialized, hospital-based practice.

Conclusion: The structure and content of the program will likely require further improvements in years to come, but currently forms the basis of the first regular 5-year, postgraduate in-hospital residency program for chiropractors in Denmark and perhaps elsewhere.

Key Indexing Terms: Education, Graduate; Internship and Residency; Nonmedical Residency; Chiropractic.

J Chiropr Educ 2019;00(0):000–000 DOI 10.7899/JCE-18-6

INTRODUCTION

By virtue of their pregraduate training, chiropractors are well prepared for the common role of the profession, being conservative management of self-referred patients with musculoskeletal pain who are seen in private practice. The pregraduate training also bestows young chiropractors with clinical and scholarly competencies that could form the basis of very different career paths, albeit this is not common.

The circumstances of the chiropractic profession vary greatly between countries and such circumstances will have a profound influence on the possibilities for interprofessional integration and professional development. Several cultural factors have made possible the establishment of a chiropractic residency program in Denmark. These factors include social aspects of the country, the Danish healthcare system, and the position of the Danish chiropractic profession in this healthcare environment.

Briefly stated, the chiropractic profession in Denmark enjoys a high degree of integration in the national healthcare system. This situation has only been possible

at the loss of some degree of autonomy and by embracing a limited scope of practice. Organized resistance and the perception of chiropractic as alternative healthcare is weak and quickly fading. Research and professional development is at a high level and the university training of chiropractors side-by-side with medical students has resulted in this acceptance and integration.

Nonetheless, the greater majority of Danish chiropractors are in private practice, either as self-employed ($n = 355$), or as assistants ($n = 170$) or interns ($n = 34$) to other chiropractors.¹ Albeit a large proportion by comparison to some other countries, a minority (<10%) of Danish chiropractors are employed as researchers, university lecturers, managers, and hospital-based healthcare providers.

While career opportunities and opportunities for formal professional development within the hospital sector have been in place for medical doctors for centuries, such opportunities are rare for chiropractors. When such opportunities have presented, they may not have been a result of coordinated efforts by the profession. A notable exception to this was the establishment in 1998 of the

Spinecenter of Fyn. This Spinecenter was a rheumatologic hospital department with a specific focus on noninflammatory spinal disorders in the Hospital of Fyn. The department was established with 3 main objectives: (1) diagnosis and treatment of said patient group, (2) research into spinal pain syndromes, and (3) to provide pregraduate clinical training for the students from the newly established chiropractic degree course at the nearby University of Odense.

In establishing the Spinecenter, it was considered paramount that pregraduate clinical training of chiropractors be established within the structures of the public secondary healthcare system, rather than as a separate student clinic, as is the case for most other chiropractic educations.

Tasked with providing pregraduate clinical training of future chiropractors, the Spinecenter opened a number of vacancies for senior chiropractors and provided regular career opportunities for hospital-chiropractors for the first time in the country. Since its establishment, the number of hospital chiropractors employed by the department has increased from 3 to approximately 20. Approximately 10 additional chiropractors have found employment at other hospitals across the country. We provided a broader description of the particular circumstances of the chiropractic profession in the Danish health care system in Appendix A.

Most chiropractic pregraduate clinical training is provided in the context of outpatient student clinics, and hospital-based internships and residencies are uncommon. An example of an exception is the chiropractic degree course at the New York Chiropractic College, which includes pregraduate clinical training in a number of university and military hospitals.² A 1-year postgraduate hospital residency is required in Switzerland before licensing for independent practice can be awarded³ and a 1-year part-time hospital internship is required in Denmark as part of the pregraduate clinical training.⁴ However, lengthy postgraduate hospital-based training is rare and our program may be the first.

The program described here is not obligatory, but extends the chiropractic base-competencies and was established with the aim of qualifying those chiropractors to undertake, "All common and several specialized functions in relation to musculoskeletal disorders, at the highest professional level, within the particular conditions of a hospital setting." We describe this program and the processes used to establish this 5-year postgraduate, hospital-based clinical internship and residency program for fully licensed chiropractors in Denmark.

METHODS

Early Efforts and White Paper

In 2007, 9 years after the Spinecenter of Fyn was established, initial talks were held between the department head, chief medical officer of the hospital, and chief chiropractor (author SO). The talks resulted in an agreement to initiate a process whereby the structure, content, and scope of a residency program for hospital

chiropractors could be formulated. From that point onward the work was largely rooted in the group of chiropractors employed at the Spinecenter with input from colleagues and professional organizations.

In 2008 (revised in 2010),⁵ this group developed a white paper with an initial description of the aims and visions of a residency program. The paper served as a basis for further project development. A version translated from Danish to English is provided in Appendix B and summarized here. The authors of the white paper envisaged a postgraduate training program that would qualify chiropractors to undertake an expert specialist function in clinical biomechanics within the secondary (hospital) healthcare sector. In addition, the training program would expand upon the already-specialized pregraduate training of chiropractors to allow them to undertake new functions in new contexts and with patient groups than was not commonplace. The authors hoped such a program would allow for optimal use of the competencies held by university chiropractic graduates, produce highly qualified practitioners, and facilitate professional development in the musculoskeletal area.

The white paper briefly described the background leading up to the paper, the pregraduate educational level of the profession, and the scope of practice as defined by licensing laws in Denmark. Existing formal clinical competencies of chiropractors were outlined and pertained to assuming responsibility for the overall clinical management of patients with musculoskeletal disorder, identifying patients in need of medical referral, assuming responsibility for the general health care or medical management of patients, and performing certain specialized tasks in relation to diagnostics and treatment of musculoskeletal disorders (Appendix B).

In the white paper, clinical competencies relevant for the management of musculoskeletal disorders were categorized into the following: (1) established competencies already held by the chiropractic profession (eg, diagnostics, imaging, conservative treatment), (2) grey-area competencies held to some degree by individuals or groups of chiropractors but not uniformly across the profession (eg, surgical referral rights, special imaging procedures, hospital admission), and (3) new competencies that were regarded as relevant, but currently outside the formal competencies of the chiropractic profession (eg, injection techniques, laboratory analyses, prescription medications; Appendix B). Other competencies included interprofessional cooperation and knowledge about overlapping medical specialties (eg, rheumatology, orthopedics).

The authors of the white paper asserted that chiropractors were likely to seek new career options and new avenues of professional development outside of private practice, if such opportunities presented. They also felt that the greater healthcare system would stand to gain from further qualifying chiropractors to undertake a wider spectrum of clinical tasks and responsibilities. Further opinion included that the academic background and university training put chiropractors in a favorable position to pursue formal enhanced qualifications. The authors deemed that the basis for qualifying chiropractors

to serve meaningfully in a greater hospital setting was deemed to be valid, but they felt that it would require a relevant residency program, a change in licensing laws, and opportunities for employment and residency training in the hospital sector.

The authors addressed in the white paper that the suggested structure and content of the desired residency program was inspired by corresponding residency programs for medical specialists: a 1-year introductory program followed by a 4-year residency program that would be split between a number of relevant hospital departments, such as spine-centers, rheumatology, orthopedic surgery and spine surgery. Not only had such a structure proven effective in the medical specialties, but in a chiropractic context it would have the added benefit of familiarity to key decision makers. By adopting the traditional medical specialty format, it allowed for a faster development of the curriculum since relevant content could be borrowed from existing medical residency programs. The content of the residency program was proposed to consist of relevant classroom courses, day-to-day clinical training in the wards, and structured log books of activities and supervisor assessments.

Course Development

In the fall of 2008, a 2-day symposium sponsored by the Foundation for Chiropractic Research and Post Graduate Education was held with the aim of “discussing and formulating, in some detail, the aims and content of a residency program, which could serve as the basis for a pilot program in 2009.” Central stakeholders were invited to take part in the symposium, including hospital chiropractors and a number of senior medical consultants in rheumatology, orthopedic surgery, and internal medicine, primarily from the Hospital of Fyn.

In the stakeholder symposium, it was agreed that the best strategy was to adopt a structure and content similar to that known from medical residency programs, but with positions in several specialties relevant to musculoskeletal disorders. Thus, a pragmatic solution was chosen, where the residency program would essentially copy the structure and relevant content from medical residency programs that could be adapted to the context of a chiropractic residency. The overall structure of the program was defined as a 1-year introductory (internship) position followed by a 4-year residency, similar to the structure of medical residency programs in Denmark. The supervised clinical training activities were to be based in 3 different specialties/departments, including the Spinecenter, orthopedic surgery (including accident and emergency), and rheumatology.

During the symposium, the work groups were charged with authoring specific descriptions of the content of the residency program in each clinical area, to include a general aim, specific competencies and specific educational activities. The clinical areas of concern were rheumatology, orthopedics, general medicine, and chiropractic (clinical biomechanics). The groups also were asked to categorize the required level of competence of chiropractors in relation to specific clinical activities into 1 of 3 levels. Level 1 was that the resident would be competent to

perform all relevant clinical functions autonomously (eg, order magnetic resonance imaging for a case of spinal pain). Level 2 was that the resident would be competent to perform some clinical functions and secure effective collaboration with other healthcare specialists where appropriate (eg, diagnostic work-up before spine surgery). Level 3 was that the resident would be competent to identify and refer appropriately to other healthcare specialists (eg, relevant and timely referral for diagnostic assessment of diabetes). The ordering of specialized imaging in the diagnostic assessment of spinal pain is provided as an example of the results from one of the work groups in Figure 1. Following the symposium, the output produced by the work groups was collated and merged to form a first draft of the educational goals and activities of a residency program.

Agreement on Pilot Residencies

By the end of 2008, the project was at a stage where a pilot program of practical implementation could be undertaken. However, this coincided with a significant structural reorganization of the national healthcare system, whereby the existing 16 counties (*amter*) were merged into 5 new regions. The primary responsibility of these 5 regions was the running of all primary and secondary healthcare sector functions. As a consequence, the Hospital of Fyn ceased to exist as a separate organization and all clinical activities were merged with other hospitals. For the Spinecenter of Fyn this meant merging with other smaller spine centers and spine surgery units to form the Spinecenter of Southern Denmark. It also entailed relocating to a larger hospital unit under new management. Fortunately, the project was met with approval by the new department and hospital management and was allowed to continue and develop in the setting of a larger regional hospital. A concrete agreement was reached that 3 pilot programs would be undertaken consecutively, after which the project would be evaluated.

Informal Interviews

As part of the pilot program assessment, a number of semistructured interviews were conducted in 2017 with 5 of the involved medical officers. These included the department heads and chief residents of the involved departments. The interviews were structured around the following questions:

- What has been your experience of the residency program?
- What are your thoughts on the content and professional level of the residency?
- In your opinion, has the residency program contributed a meaningful raise in competency of the involved chiropractors?
- What do you think could or should have been done differently?
- Is such a residency program the right approach to ensure enhanced qualifications and integration of chiropractors in the hospital sector?

Specific competencies

- Title: Ordering of special imaging
- Entry level: 2 (competent to perform some clinical functions and secure effective collaboration with other healthcare specialists where appropriate)
- Required level: 1 (competent to autonomously perform all relevant and necessary clinical functions)

Notes:

1. The candidate can select the appropriate modality
2. The candidate can make appropriate use of x ray, MRI, CT, scintigraphy, PET/CT, dexascan, ultra sound
3. The candidate can draft adequate and concise referrals
4. The candidate can advise colleagues on special imaging

Specific educational activities

- Competency: Ordering of special imaging
- Activity: Clinical supervision
- Evaluation: Tutor informal assessment (approved/not approved)

Notes:

1. Minimum 50 approved referrals for x-ray or MRI
2. Minimum 10 approved referrals for CT
3. Minimum 10 approved referrals for scintigraphy or dexa
4. Must include referrals for imaging in diagnostic work-up of DJD/DDD, disk herniation, central stenosis, malignancy, instability, spondyloarthritis

Figure 1 - An example of the output from one of the symposium work groups. This example is about the ordering of specialized imaging in the diagnostic assessment of spinal pain.

The interviews were conducted over the phone by a research assistant and responses were recorded as informal notes. No qualitative assessment was performed.

RESULTS

External financial support for the costs of the pilot program were secured from the Foundation for Chiropractic Research and Post Graduate Education. Three pilot residencies started in 2009 and included 3 of the authors of this paper (MBK, 2009; RF, 2010, SVV, 2012). All 3 candidates were experienced chiropractors with a number of years of hospital employment before the project.

As a result of the previously described symposium, a first draft of the educational goals was in place for the first candidate. However, the goals were heavily revised during the residencies by the 3 chiropractors enrolled in the pilot programs. There currently are 31 specific competency criteria in the 1-year introductory program and 108 in the 4-year residency program, 60 of which relate to the role of healthcare expert. The educational goals span a wide range of competencies, from “attitudes to interdisciplinary cooperation” to broader clinical skills, such as “diagnostic ultrasound” and also include some specific and concrete clinical activities, such as “Colle’s fracture reduction.”

The educational goals specified which competencies were to be acquired, the level of competency to be reached and the manner in which it should be achieved. Individual

competencies were categorized according to 7 roles of health care professionals, based on the Canadian *Educating Future Physicians for Ontario Program*.^{6,7} This structure also is used in most medical residency programs in Denmark. The roles included healthcare expert, communicator, cooperator, leader/administrator, health advocate, professional, and scholar/academic. Examples are presented in Table 1.

Several competency assessment checklists were prepared to facilitate systematic assessment of the supervised clinical training (example in Fig. 2). In addition to the educational goals and competency/evaluation checklists, the chiropractors completed a portfolio, which served primarily to gather and organize the individual elements of the residency and to provide a framework for reflection and self-directed learning.

Four programmatic opinions were drawn from the semistructured interviews with the involved medical officers. The first was that, as expected, some hurdles were identified early in the start-up phase, but the residency program was perceived to be useful and professionally enriching for the chiropractor and involved departments. Second, the content and professional level of the residency program were deemed appropriate, but specific suggestions were made to expand the program with further emphasis on pharmacology, traumatology, and spine surgery. Third, agreement was uniform that the residency had led to a meaningful increase in clinical competencies of the chiropractors involved. Fourth, all those interviewed

Table 1 - Examples of Educational Goals (Competency Criteria) for the Introductory Internship Program and the Residency Program

Competency # (Role)	Criteria	Strategy	Evaluation
S6 (Healthcare Expert) ^a	Order relevant medical imaging, interpret results thereof and integrate in clinical practice	Self-study and clinical work	ADJ; PFB
K8 (Healthcare Expert) ^b	Perform conservative treatment and closed reduction of Colles fractures (including administration of local anesthetic)	Self-study, observation and clinical work in Accident & Emergency	K1; RS
K6 (Communicator) ^b	Author complete and legally sufficient documents and attestations	Clinical work	RS

ADJ, Journal audit; PFB, Patient case write-up; K1, Competence check list K1; RS, Reflection based on discussion (from prepared agenda).

^a Example from the 1-year introductory internship program.

^b Example from the 4-year residency program.

agreed that the residency program was an appropriate and useful manner to further qualify and integrate chiropractors in a hospital setting, but some suggested there was a need to re-evaluate the time allocated to different subject areas.

By 2016, the pilot programs had run their course. Two chiropractors (MBK and RF) had completed the residency

program and 1 (SVV) was paused due to other employment. One residency program (RF) had been interrupted for a year, as the candidate was offered further employment at the department of orthopedic surgery before completing the residency program. One resident (MBK) remains employed at the Spinecenter of Southern Denmark, but now as a “Specialist chiropractor” with a

Assessment by direct observation

The candidate can:

	Yes	No
Provide adequate patient information about the imminent procedure?	<input type="checkbox"/>	<input type="checkbox"/>
Perform clinical evaluation of the forearm and hand?	<input type="checkbox"/>	<input type="checkbox"/>
Read and diagnose plain x-rays of wrist with respect to fractures?	<input type="checkbox"/>	<input type="checkbox"/>
Assess the need for further x-ray or CT?	<input type="checkbox"/>	<input type="checkbox"/>
Demonstrate correct sterile-procedure in connection with local anaesthetic?	<input type="checkbox"/>	<input type="checkbox"/>
Perform local anaesthetic?	<input type="checkbox"/>	<input type="checkbox"/>
Perform closed reduction?	<input type="checkbox"/>	<input type="checkbox"/>
Inform patient and next of kin about treatment and prognosis (including expected results)	<input type="checkbox"/>	<input type="checkbox"/>
Plan ambulatory treatment and follow-up	<input type="checkbox"/>	<input type="checkbox"/>
Competency 'Treatment of Colles fracture' is satisfactory?	<input type="checkbox"/>	<input type="checkbox"/>

Figure 2 - Competency checklist for closed reduction of a Colle’s fracture corresponding to competency K8 from the educational goals.

different job description. He is responsible for professional development and implementation of rational clinical pathways. It also is his responsibility to provide professional supervision and tutoring of younger colleagues, students, medical doctors, and others. He also functions as a professional advisory to the management and is charged with supporting efficient running of the department. The second resident (RF) has left the department and started private practice with a specialist focus on sports injuries.

The educational goals will continue to be revised in the future. The program has been accepted by hospital management as a part of the regular in-house professional development and a new residency position will be opened on a yearly basis. The first regular position was filled in the fall of 2017 and 2 additional positions were filled in the fall of 2018.

DISCUSSION

As this was a novel program and involved a significant level of change within the culture of the healthcare environment where the program took place, many lessons were learned during development and the pilot programs. Our thoughts are presented below as a means to help other educators who, in the future, might consider implementing a residency program.

Consider the Workload Before Committing

Considerable time, effort, and commitment are required to see such a project through to fruition. A project like the current one is unlikely to succeed as a part-time project or an adjunct to private practice and failed attempts may make subsequent attempts more difficult. Therefore, it is important to have a group of chiropractors who are prepared to commit and pursue full-time hospital careers and to pioneer professional development for chiropractors in that context. Conversely, that also means such a project will be vulnerable and reliant on the continued commitment of the group of involved chiropractors.

Create Opportunity from the Ground Up

The residency program did not start as a structured or finalized concept carried forward by hospital management or politicians. Rather, it grew slowly from the clinical ground level and progressed only as opportunities for development presented. By the time the project was launched, chiropractors had been employed at the hospital for a number of years and had become a “known factor” in the clinical environment and among hospital management. It was important to have clinically active medical specialists with first-hand experience of chiropractors as colleagues in a hospital setting. These colleagues, who understood the competencies and limitations of their chiropractic colleagues, were willing to advocate the project to their superiors on that basis. These colleagues played a central role as they were seen to vouch for the clinical relevance of the residency program from a medical perspective.

Pitching the Project to Management

We found that medical officers higher in the system wanted to be assured that the project had popular support

from the clinical staff, especially medical doctors, before backing it. This was likely to ensure that the project would not cause unnecessary disturbances or problems. Once concerns about the clinical viability had been allayed, management identified a number of organizational benefits of in-house professional development on their own accord. From our initial white paper, “the benefits of further qualifying an academic profession and providing career opportunities” were then obvious.

Still, it remained important not to force commitment too early, as there was a sense that management was asked to take risks in developing the program. Therefore, the program was launched as a pilot program, external funding was secured to ensure that the project did not strain the budgets of participating departments (albeit this proved not to be the case), and the limited rights for prescription of pharmaceuticals were only introduced after the first pilot programs had completed.

We found it helpful to openly acknowledge that professional politics is a reality that cannot be ignored or downplayed. Importantly, they should not be allowed to stand in the way of continuing professional development or a rational approach to clinical work.

Defining the Role of Chiropractors

Clinical work in hospitals has traditionally been organized in reference to the medical specialties. Perhaps unsurprisingly, we found that other healthcare professionals did not immediately see how chiropractors fit into such a deep-rooted organization. We also learned that this was a recurring issue that needed to be addressed not once, but every time new medical colleagues were involved in the program. The role of chiropractors in a hospital setting may or may not seem obvious to chiropractors, but it is most likely not self-evident to other healthcare professionals. It was important that the role of chiropractors was defined in collaboration with other healthcare professionals and that the chiropractors were willing to adapt the role in relation to the needs of the organization, as opposed to defining a need that would fit a preconceived role. This process of negotiating a common understanding of the competencies and roles of chiropractors had to be repeated in every new context.

Furthermore, the role of chiropractors may differ substantially in relation to various medical specialties. As an example, we found that in orthopedic surgery, which often is highly selective and specialized, chiropractors were naturally cast as generalists capable of straddling different specialties (eg, knee, shoulder) and identifying relevant nonsurgical strategies for management of various conditions. Conversely, in a Spinecenter with a mix of healthcare professionals of very different backgrounds, the role of chiropractors may more naturally be that of a specialist in a relatively narrow field.

High Level of Clinical Competence

There is no substitute for clinical competence and the collegial trust that comes with it. We suspect it makes no difference at all whether chiropractors have all the opportunities and the contacts, are able to provide services

in demand in a specific niche, are good team players, and so forth, if the level of professional competency is considered questionable. Conversely, it makes all the difference that chiropractors are seen by medical authorities to be safe, knowledgeable, skilled, professional, and capable of making rational and timely clinical decisions. The importance of high levels of clinical competence cannot be stressed enough. In professional relationships, recognition of professional competence is akin to trust in personal relationships. Without it, everything is difficult. With it, everything is easy.

Recognition of the professional competence of hospital chiropractors comes not only from expertise within a specific niche but, importantly, from these chiropractors acknowledging and respecting their own limitations and the expertise of others. Very often, this equates to not only providing good answers, but, just as importantly, asking good questions.

Status

Following the successful completion of the pilot programs, an arrangement has been made whereby the Hospital of Lillebaelt will continue the internship and residency program, not as a pilot program, but as part of the regular professional development activities of the hospital. A new internship and residency position will be posted on a regular basis, approximately once every year to ensure a continuous flow of specialist chiropractors. The first such position was filled in the fall of 2017 by a recent graduate. As such, this is the first chiropractor to take up a regular position as a resident in the program. The second and third such regular positions were posted and filled in the fall of 2018.

Perspectives and Future Opportunities

As described above, a workable solution for a postgraduate residency program has been tested. However, at this time the program is restricted to a single hospital and the volume of residents is very low. If the program is to fulfill the ambitions of the initial white paper for the benefit, not only of the involved chiropractors, but for the profession and the Danish healthcare system in general, it must find broader implementation. The Spinecenter of Southern Denmark is by far the largest, but not the only hospital employer of chiropractors in Denmark. A smaller number of chiropractors (approximately 10) are employed in orthopedic surgery, radiology, and other spine-centers in 3 of the 5 regions. These are the obvious next candidates for a specialist chiropractic resident.

CONCLUSION

We conclude, that the qualifications that chiropractors are conferred by virtue of a pregraduate university course provide a good basis on which to build further competencies, and this could prepare them for a range of nontraditional roles that chiropractors could have in the increasingly complex management of musculoskeletal disorders and specialized hospital services. The residency programmed described has so far demonstrated that it is

feasible in a Danish context for further qualifying chiropractors for such a role, but still is very much in its infancy. It remains to be seen how many Danish chiropractors will pursue such new career opportunities and to what extent the healthcare system will make use of such trained chiropractors.

FUNDING AND CONFLICTS OF INTEREST

This work was funded internally. The authors have no conflicts of interest to declare relevant to this work.

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Concept development: SFDO. Design: SFDO, MBK, RF, SVV. Supervision: SFDO. Data collection/processing: MBK, RF, SVV. Analysis/interpretation: SFDO. Literature search: SFDO. Writing: SFDO. Critical review: SFDO, MBK, RF, SVV.

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