

Physical Therapy

Journal of the American Physical Therapy Association



The Role of Physical Therapists in Smoking Cessation: Opportunities for Improving Treatment Outcomes

Rose M. Pignataro, Patricia J. Ohtake, Anne Swisher and Geri Dino

PHYS THER. 2012; 92:757-766.

Originally published online January 6, 2012

doi: 10.2522/ptj.20110304

The online version of this article, along with updated information and services, can be found online at: <http://ptjournal.apta.org/content/92/5/757>

Collections

This article, along with others on similar topics, appears in the following collection(s):

[Cardiovascular/Pulmonary System: Other](#)
[Health and Wellness/Prevention](#)
[Health Policy in Perspective](#)
[Other Diseases or Conditions](#)
[Patient/Client-Related Instruction](#)
[Professional Issues](#)
[Professional-Patient Relations](#)

e-Letters

To submit an e-Letter on this article, click [here](#) or click on "Submit a response" in the right-hand menu under "Responses" in the online version of this article.

E-mail alerts

Sign up [here](#) to receive free e-mail alerts

The Role of Physical Therapists in Smoking Cessation: Opportunities for Improving Treatment Outcomes

Rose M. Pignataro, Patricia J. Ohtake, Anne Swisher, Geri Dino

Tobacco use constitutes one of the greatest threats to public health worldwide. As a preventable cause of mortality and chronic disease, tobacco use in the United States results in an estimated 443,000 deaths each year through both direct exposure and second-hand smoke.¹ An additional 8,600,000 people across the nation have chronic illness due to smoking.¹ As physical therapists, we must realize that tobacco use affects all areas of our practice, including cardiovascular, musculoskeletal, neurological, and integumentary health throughout the life span. In order to provide optimal care for the clients we serve, it is essential for physical therapists to screen for tobacco use and incorporate cessation strategies as part of our interventions.²

There is a substantial unmet demand and opportunity for our profession to promote tobacco cessation.² Despite evidence that links successful cessation to counseling by health care providers, fewer than 40% of insured adults report receiving such advice.³ In addition, receiving advice from 2 or more health care practitioners more than doubles the odds of successful cessation,⁴ further supporting the need for physical therapists and physical therapist assistants to contribute our skills and expertise as part of the interdisciplinary health care team. Successful cessation efforts have been demonstrated by other health care professionals, including physicians, dentists, dental hygienists, nurses, and pharmacists, and are an important component of

preventive medicine and population health.⁵ According to the US Medical Expenditure Panel Survey, in 2007, physical therapists conducted a total of 88 million ambulatory visits for approximately 9 million adults aged 18 years and over.⁶ The number of visits (an average of 9.6 per patient, per episode)⁶ and nature of our interactions, which include extended, personalized, one-on-one care, present a unique opportunity for physical therapists and physical therapist assistants to provide support for tobacco cessation² as a means of enhancing treatment outcomes and health-related quality of life. In addition, due to the nature of our clientele, physical therapists are in a prime position to address serious health care disparities. People with disabilities have limited access to health care and follow-up visits and have an average smoking prevalence of 30.5% compared with a rate of 21.7% for those without disabilities.⁷ Furthermore, the health effects of tobacco use may be magnified in people with disabilities due to the clustering of other risk factors, such as obesity and the tendency toward a sedentary lifestyle.⁷

According to the *Guide to Physical Therapist Practice*, the physical therapist's scope of services includes assessment and intervention designed to "promote not only optimal physical function but optimal wellness . . . and optimal quality of life."^{8(p13)} Furthermore, as we advance toward the attainment of Vision 2020⁹ and direct access enables physical therapists to become practitioners of

choice for people seeking better health, the profession needs to become more proactive and skilled in recognizing and promoting behavioral changes that have widespread effects at all levels of the *International Classification of Functioning, Disability and Health* (ICF model), from pathophysiology to impaired individual capacity and performance.¹⁰ Tobacco cessation counseling is consistent with the role of our profession in promoting wellness, improving immediate health, and preventing secondary complications of chronic disease.^{2,11} Therefore, the aims of this article are: (1) to identify the impairments commonly managed by physical therapists that are negatively affected by tobacco use and (2) to provide a rationale and guidelines to enable physical therapists and physical therapist assistants to successfully engage in smoking cessation interventions.

The Impact of Smoking on Physiologic Systems

The adverse effects of tobacco use on cardiopulmonary function are well established and recognized.¹² Less evident, but equally important, is its impact on all aspects of physical therapist practice, including integumentary, musculoskeletal, and neuromuscular health. Adverse effects of smoking occur throughout the life span, from prenatal exposure, through childhood, adolescence, and all phases of adulthood. As tobacco use has the potential to affect multiple physiologic systems, it is likely that cessation efforts will improve outcomes for many of the

conditions and impairments treated by physical therapists.

General Physiologic Effects of Smoking

Many pathophysiologic changes caused by tobacco use can be traced to the pro-inflammatory effects of cigarette smoke. This inflammation is a product of oxidative tissue injury and is evidenced by increased levels of inflammatory cytokines in smokers, such as interleukin-6 (IL-6), tumor necrosis factor- α (TNF- α), and C-reactive protein.¹³ At the cellular level, smoking contributes to mutations in proteins that can later manifest as tumors.¹⁴ Smoking also can lead to adverse changes in the mitochondria and impaired function along the respiratory chain, causing increased cellular stress and decreasing the ability to produce new, healthy tissue.¹⁴ In addition, hemoglobin's affinity for carbon monoxide in cigarette smoke is 200 times higher than its affinity for oxygen.¹⁵ Due to this effect, increased levels of carbon monoxide within the bloodstream decrease oxygen saturation¹⁶ and interfere with the electron transport chain within the mitochondria, leading to a decrease in cytochrome C oxidase.¹⁷ This effect can be especially pronounced in tissues with a high metabolic rate, such as skeletal muscle, and the central nervous system.¹⁷ Smoking also interferes with oxygen transport by reducing the proliferation of red blood cells.¹⁵ In addition, as part of this cycle, smoking decreases concentrations of antioxidant vitamins and nutrients such as folate and riboflavin,¹⁸ vitamins E and C,¹⁹ and melatonin.²⁰ Melatonin is not only an important antioxidant but also functions as an anticarcinogenic.²⁰

Smokers also experience impaired lipid metabolism. The oxidation of low-density lipoproteins leads to a cytotoxic environment and may pro-

mote platelet adhesion, DNA damage, and apoptosis.²¹ Metabolic disturbances in smokers also include impaired glycolysis.²¹ These factors are particularly harmful given the tendency for smokers to engage in other unhealthy behaviors such as the consumption of a high-fat diet, which often is rich in simple carbohydrates and deficient in antioxidant nutrients,²¹ and can result in a clustering of dangerous risk factors for chronic illness.

Smoking also leads to tissue damage through accelerated vascular aging. In addition to its impact on the cardiac system, accelerated vascular aging has been implicated in increased risk of cardiovascular accident and vascular dementia.¹⁴ This effect is due to the presence of heavy metals and toxins in cigarette smoke¹⁴ and the effects of nicotine.²² Nicotine increases systemic blood pressure by stimulating sympathetic nerve endings, leading to vasoconstriction and increased vascular resistance,²² which contribute to tissue hypoxia throughout the body. Peripheral vascular disease and reduced blood flow also increase the risk of other health problems, including metabolic syndrome,²³ a precursor to diabetes. Cessation is an important step in limiting systemic inflammation and oxidative tissue injury, thereby enhancing current healing and future health.

Effects of Tobacco on the Integumentary System

Tobacco use impedes tissue healing through several mechanisms. Smoking not only causes transient deficiencies in tissue oxygenation, but once oxygen delivery has been restored, reperfusion injury also may occur.¹⁷ At the integumentary level, smoking has been shown to reduce cutaneous blood flow by as much as 40% due to the effect of nicotine on cholinergic fibers, which supply the

vascular bed.²⁴ Nicotine suppresses immune response and decreases the proliferation, viability, and function of lymphocytes,²⁴ increasing the likelihood of infection. In neutrophils, nicotine stimulates the release of proteases, which may accelerate tissue destruction and further inhibit repair.²⁵ During the proliferative phase, tobacco use reduces the ability of fibroblasts to migrate and interferes with wound contraction.²⁴ It also decreases plasma levels of vitamin C needed for collagen formation.²⁴ Furthermore, nicotine not only lowers the formation of collagens but also decreases synthesis of procollagens I and II and hydroxyproline,¹⁵ all of which are required for production of ground substance. Overall, for those who use tobacco, collagen production is slowed, scar tissue is weaker, and healed tissues break down more easily,^{15,24} increasing risk of recurrent injury.

Effects of Tobacco on the Musculoskeletal System

Smoking has been shown to contribute to musculoskeletal problems in many different ways. It results in reduced quadriceps muscle strength²⁶ and increased muscle fatigability.²⁷ In a study comparing the strength of back extensors among male athletes, smokers had a higher rate of perceived exertion as well as fatigue,²⁸ and these effects were observed in people as young as 18 years of age.²⁸ It has been speculated that these problems may be due to oxidative damage to muscle proteins²⁶ and mitochondrial impairment.²⁷

As people age, smoking may lead to increased weakness and reduced balance. One study examining physical functioning in women aged 65 years and older showed that smokers had less strength, poorer balance, and lower physical performance scores for agility, coordination, and gait compared with their nonsmoking

counterparts.²⁹ In another population of older women, smokers had impaired performance on timed rise and walk tests and grip strength.³⁰ It is speculated that atherosclerotic damage in the lower extremities may perpetuate these functional limitations by reducing tolerance to physical activity.²⁹

Through its effects on metabolism and circulation, tobacco use also leads to bone demineralization. Smoking can increase fracture risk by depleting estrogen, which can contribute to osteoporosis.¹⁴ Tobacco use has been shown to interfere with the absorption of calcium and vitamin D.³¹ Elevated cortisol levels³² associated with smoking contribute to bone reabsorption.³² Additionally, smoking inhibits the differentiation of osteoclasts, leading to the reduced formation of new bone.¹⁴ These factors work collectively to decrease bone density and increase the risks of fracture³³ and fracture nonunion.³⁴ Among clients typically seen in physical therapy settings, tobacco cessation limits damage to muscles and bones, preventing future decline and optimizing current recovery of function.

Effects of Tobacco on the Neuromuscular System

Toxic effects of tobacco use also have been established within the neuromuscular system. Nicotine readily crosses the blood-brain barrier¹⁵ and has a detrimental effect on cerebral circulation. Smokers were shown to have a 1.8 times greater risk of silent cerebral infarct compared with nonsmokers.³⁵ Risk increased with higher doses of tobacco.³⁵ The lifetime accumulation of heavy metals such as lead due to smoking has been associated with lower levels of language processing, hand-eye coordination, executive functioning, verbal and visual memory, learning, and global function

and with higher rates of white matter lesions and cerebral atrophy in older adults.³⁵ Among the heavy metals contained in cigarette smoke, vinyl chloride has been implicated as a causative agent for brain tumors.³⁵ Heavy smoking in midlife is associated with a higher risk of dementia and Alzheimer disease³⁶ and a 150% higher risk of amyotrophic lateral sclerosis than among nonsmokers.³⁷ In animal studies, prenatal exposure to carbon monoxide led to decreased deposition of myelin in peripheral nerves,³⁸ possibly increasing the likelihood of neuropathy. It has been suggested that nicotine, free radicals, and other toxins in cigarette smoke may cause degeneration or interfere with axonal conduction, particularly in fibers that have already been damaged or demyelinated.³⁸ Chronic exposure to carbon monoxide from smoking increases levels of hemeoxygenase within the bloodstream, a factor that may contribute to the development of neuropathic pain.³⁹ Smoking may enhance excitatory transmission in the dorsal horn of the spinal cord by stimulating nicotinic acetylcholine receptors, thereby increasing the intensity of neuropathic pain.⁴⁰

In terms of other neuropathologic impairments, people who smoked 20 to 40 cigarettes per day had twice the risk of developing multiple sclerosis compared with nonsmokers.⁴¹ Among those who already had multiple sclerosis, smokers were more likely to have the more severe form of primary progressive disease and more severe symptoms and functional disability.⁴¹ Due to links between smoking and cognitive function, neuropathic pain, and impairment, tobacco cessation should be a key element in physical therapy interventions to address prevention and restoration in neuromuscular pathologies.

Smoking has been linked to an increased likelihood of autoimmune diseases such as rheumatoid arthritis (RA) and systemic lupus erythematosus.¹³ The relative risk of RA in current smokers is 3.8 times higher than in nonsmokers,¹³ and among those with the disease, smokers are less likely to respond to anti-TNF alpha pharmacotherapy,¹³ such as infliximab. The link between smoking and RA is thought to be related to the production of proinflammatory cytokines within the synovium.⁴² The association between tobacco use, RA, and systemic lupus erythematosus should be reflected in our clinical practice patterns when planning for care of people with these conditions.

There are links between smoking and increased likelihood of chronic pain³⁹ resulting from conditions such as fibromyalgia,^{43,44} and low back dysfunction.^{45,46} Research demonstrated that smokers with fibromyalgia had higher levels of substance P in their cerebrospinal fluid compared with nonsmokers.⁴⁴ The intensity of smoking in the sample ranged from less than 1 pack per day to more than 2 packs per day, with 60% of smokers averaging 1 to 2 packs per day, duration of use unknown.⁴⁴ In terms of low back pain, it is thought that other health impairments such as chronic coughing,^{28,47} which increases intrabdominal pressure and places additional stress on the spine, may exacerbate the problem. Nicotine may cause cell damage in the nucleus and annulus of the intervertebral disk,⁴⁸ a contributing factor in degenerative spinal changes.⁴⁹

In general, by increasing proinflammatory cytokines, smoking likely amplifies pain signals,⁴⁹ and nicotine may lower the pain threshold within the central nervous system.⁴⁶ In studies investigating treatment of

chronic pain, smokers were more likely to use opioid medications than nonsmokers and were more likely to use analgesic medication, in general.⁴³ Although smokers were more likely to use more pain medication, they also were less likely to be satisfied with the resulting levels of relief.⁵⁰ In one study, smokers with chronic pain demonstrated more intense symptoms than nonsmokers on all domains of the Brief Pain Index, including functional impairment, and had lower scores on the 36-Item Short-Form Health Survey questionnaire (SF-36), reflecting greater deficits in health-related quality of life.⁴³ Additionally, nicotine dependence was associated with greater disturbance in affect and mood, less ability to perform normal work, and less overall enjoyment of life.⁴³

There is a dose-response relationship between smoking and prevalence of chronic pain.⁵¹ Therefore, clinicians working with this population need to prioritize smoking cessation during their treatment planning. Cessation should be approached with care and support because smokers deprived of nicotine will initially have less pain tolerance^{38,39} and tobacco use likely involves a complex relationship between smoking as a coping strategy and its simultaneous effect in exacerbating pain.⁴⁷

The Unique Role of Physical Therapists and Physical Therapist Assistants in Smoking Cessation Intervention

As a profession that has been shaped by our commitment to optimal function and health-related quality of life, it is essential that our quest toward evidence-based practice be focused on priorities that are consistent with epidemiologic data suggesting greatest need. The myriad effects of smoking on cardiopulmonary, vascular,

musculoskeletal, neuromuscular, and integumentary impairments clearly indicate an essential obligation for physical therapists and physical therapist assistants to play a greater role in tobacco cessation in order to enhance treatment outcomes and advance prevention. In the United States, tobacco use represents the greatest preventable cause for illness and disability. Reducing its use can have a substantial impact on the health and wellness of a significant component of the population, including those who do not use cigarettes but are subject to the effects of secondhand smoke, such as infants and children.

As practitioners dedicated to using noninvasive measures to promote and maintain optimal wellness, tobacco cessation intervention is consistent with the role of our profession in improving immediate health and preventing secondary complications of chronic disease. People who smoke have 44% fewer years of healthy life than those who have never used tobacco.⁵² In addition, because people with disabilities tend to have higher smoking rates than those without disabilities,⁵³ physical therapists and physical therapist assistants are in a key strategic position for providing intervention to those with greatest need. Importantly, practice patterns for physical therapists provide ample opportunity for many components of successful cessation counseling.^{11,54} Visits with clients are personalized, with frequent follow-ups that enable us to build rapport and tailor advice to each patient, as well as provide ongoing support throughout the course of someone's cessation efforts.

While providing care for a condition that is potentially exacerbated by tobacco use, the physical therapist and physical therapist assistant may

encounter opportunities that serve as “teachable moments” to encourage smoking cessation.^{11,54} This is true not only for outpatient settings, but in the acute care and inpatient rehabilitation environments as well. The Joint Commission for Accreditation of Healthcare Organizations' operating guidelines for acute care facilities require documentation of smoking status and provision of cessation counseling in patients hospitalized due to any of 3 chronic diseases: community-acquired pneumonia, acute myocardial infarction, and congestive heart failure.⁵⁵ In the rehabilitation setting, patients who smoke are often transitioning from acute care and, therefore, have likely been through a period of forced abstinence. The rehabilitation environment can provide an opportunity to capitalize on this period of abstinence through continued counseling and support.⁵⁶

In a 2002 survey of ambulatory care physicians, 78.6% of patients who smoked did not receive any counseling advice regarding cessation during their visit.⁵⁷ With direct access, physical therapists are increasingly becoming the entry portal for people accessing the health care system. In addition, the depth of our relationships with our patients enhances our ability to perform detailed assessments and create interventions that best suit the unique needs of each individual.

There are several potential barriers to providing tobacco cessation counseling that must be addressed. One is the lack of training and practical skills in providing such services.⁵⁴ Other perceived challenges include time constraints and overriding responsibilities to care for the client's primary condition.⁴⁴ In general, health care practitioners also cite a decreased awareness of resources and effective treatment options,

anticipated resistance to advice among patients who smoke, and a lack of reimbursement for cessation counseling as reasons for not providing this service as part of their standard care.⁴ Specific to physical therapists, a survey conducted in 2004 collecting data from physical therapists in New York, California, and Tennessee showed that barriers to providing tobacco cessation interventions included a lack of self-efficacy as well as limited outcome expectations.² A survey conducted by Bodner and colleagues in 2009 showed that key barriers among Canadian physical therapists were lack of time and lack of resources.¹¹

It is important to recognize that 60% of current smokers would like to quit⁵⁸ but are hampered by addiction. As integral members of the interdisciplinary care team, the physical therapist and physical therapist assistant play an essential role in addressing this dilemma. Studies have demonstrated that when cessation advice is received from 2 or more health care professionals, smokers are nearly 3 times more likely to make an attempt to quit.⁴ Persistence is key because it is likely to take many unsuccessful attempts before someone is able to achieve sustained cessation.⁵⁸

Tobacco Use Management Strategies for Physical Therapists and Physical Therapist Assistants

The Agency for Healthcare Research and Quality recommends that all patients who smoke should be offered options to promote cessation, such as nicotine replacement therapy, social support, and skills training, including nutritional counseling and physical activity.⁵⁹ The expertise of the physical therapist in tailoring and monitoring response to physical activity is an essential part of this formula. Through coordi-

nated care and treatment planning, the physical therapist and physical therapist assistant can work together toward meeting goals for tobacco cessation through continued monitoring, support, and encouragement. With respect to patient autonomy, the decision to quit must originate with the person who smokes.⁶⁰ However, there are steps that can be taken to foster and support cessation efforts. According to the US Department of Health and Human Services (USDHHS) reference guide for clinicians titled *Treating Tobacco Use and Dependence*,⁶⁰ these steps include counseling the patient to set a quit date and make a plan that will allow him or her to cope with the expected withdrawal. The quit date should fall within a month of the decision to quit, and it can be associated with a special occasion such as a birthday or anniversary. Maintaining smoking abstinence involves rewards, as well as periodic review of the benefits of cessation and the reasons for wanting to succeed.

Brief advice has been shown to have a positive impact on cessation and quit attempts.⁵⁴ In the physical therapy setting, smoking questionnaires can help identify smokers, their level of addiction, and the intention to quit.⁵⁴ The USDHHS has published clinical guidelines for treating tobacco use and dependence. Guidelines for providing brief advice includes the “5 A’s”: asking about tobacco use, advising people to quit, assessing willingness to quit, assisting the quit attempt through counseling or referral, and arranging for follow-up.⁶¹ In terms of time management, the 5 A’s can take as little as 3 minutes.⁶² A shortcut consisting of only 3 steps—asking, advising, and referral—can take even less time and still be effective.⁵⁵ For those people who are not yet ready to quit, clinicians may use the “5 R’s”: reviewing relevance of smoking and

the role it plays in someone’s life; discussing risk through the impact of smoking on health; identifying roadblocks and rewards by inquiring about the pros and cons of smoking relative to the advantages of cessation and the potential impact of secondhand smoke on the health of family members and friends; and repetition, including offering a follow-up appointment or opportunities to discuss quitting in more detail.⁶¹ The Appendix provides a flow chart for use in providing tobacco cessation counseling for patients who are willing to quit or may be considering quitting in the future. By assessing smoking status and intention to quit, the physical therapist then can collaborate with the physical therapist assistant to match counseling strategies with the patient’s state of readiness, adapting techniques as needed as the patient’s status changes. As the physical therapist assistant implements the plan of care, opportunities for reinforcement and encouragement can be met with appropriate use of the USDHHS guidelines. Together the physical therapist and physical therapist assistant can create a united front in implementation of strategies, as well as individualized approaches to patient communication.

There is some evidence that exercise and other physical therapy interventions that stimulate endorphin release can help mitigate symptoms of nicotine withdrawal.⁶³ Exercise and increased physical activity may help reduce cravings, negative changes in mood, and withdrawal symptoms as an aid to cessation.⁶⁴ In smokers who were trying to quit, exercise increased self-efficacy and confidence for success.⁶⁵ When used in combination with nicotine replacement therapy, exercise has been shown to facilitate cessation, increase functional capacity, and delay weight gain in female smok-

ers.⁶⁶ In addition, increased physical activity may help decrease insomnia⁶⁷ and serve as a replacement activity⁶⁸ or diversion for those working toward breaking their addiction.

Although cessation is the optimal outcome, exercise offers a way of counteracting at least some of the deleterious effects of tobacco use. Physical activity can help to reduce oxidative stress by increasing concentrations of endogenous antioxidants, improving clearance of lipids and triglycerides, and enhancing glucose metabolism.²¹ Harm reduction through increased physical activity is especially pertinent given the increased likelihood for smokers versus nonsmokers to lead a sedentary lifestyle.⁶⁵ Smokers who are physically active live longer than sedentary smokers and reduce their risk of cerebrovascular disease and cancer of the lung, colon, and rectum.⁶⁹ Smokers who exercise also have better peripheral blood flow and less vascular resistance, as well as lower resting heart rates.²³

Physical therapists and physical therapist assistants should closely monitor smokers during exercise due to their reduced tolerance compared with that of age-matched nonsmoking cohorts.^{70,71} During treadmill testing, male smokers who were healthy and aged 20 to 25 years showed higher heart rates and systolic blood pressure as well as shorter maximal duration compared with their nonsmoking counterparts.⁷⁰ In a similar study of smokers aged 13 to 36 years, lower cardiovascular fitness was observed.⁷¹ It is important to emphasize the potential for recovery when encouraging people to stop smoking. In the study by Benaards and colleagues,⁷¹ detrimental effects of smoking on physical activity appeared reversible in

participants who had stopped smoking before the age of 36 years.

Sometimes, the best service provided by a clinician in terms of supporting cessation is patient referral. We do not always possess all of the resources and skills necessary to meet each individual's needs. Additional resources for aiding cessation can be found through the surgeon general's Web site: www.surgeongeneral.gov/tobacco. One option is the use of quit lines as an adjunct to brief advice. In the United States, there is a national telephone number (1-800-QUITNOW) that will refer callers to local services. Quit lines have been shown to enhance cessation rates by 30%,⁶¹ and smokers have been found to be 4 times more likely to use a quit line than to seek face-to-face-counseling.⁶¹ Additional resources are shown in the Appendix.

Working Toward the Future

Simply put, smoking negatively affects all of the body's systems. Physical therapists and physical therapist assistants have a unique opportunity to help people quit smoking. As a profession, our first step is to recognize that cessation is indeed part of our role as health care providers. We also need to find ways to expand our education in this regard because training has been shown to increase provider confidence, as well as the likelihood and quality of cessation counseling.⁷² In other health care professions, such as dentistry and dental hygiene, training workshops in evidence-based interventions have been proven effective for increasing cessation counseling by practitioners.⁷³ In terms of training format, Web-based platforms and self-study may help reach practitioners who are unable to attend workshops in person.⁷³ Training should target positive outcome expectations by demonstrating that our profession can make an enor-

mous impact by providing brief advice regarding tobacco cessation.² Training also should emphasize self-efficacy, or the practitioner's belief that he or she can provide effective counseling.² Initial studies examining barriers to smoking cessation counseling among physical therapist students found that lack of confidence in one's ability to communicate with patients who smoke could be improved by a seminar on smoking cessation counseling skills.⁷⁴

Physical therapists and physical therapist assistants have an obligation as well as a successful history in providing public service. As outlined in the American Physical Therapy Association's guiding document, *Vision 2020*,⁹ physical therapists and physical therapist assistants are dedicated to providing services consistent with core values of altruism, caring, and respect by working with other professionals to promote optimal health and wellness in individuals and communities. Smoking cessation counseling is a key expression of these goals. Although some may be concerned that cessation counseling detracts from the main focus for physical therapy intervention, in reality the multiple physiologic effects of smoking make tobacco cessation a key factor in prevention of cardiopulmonary, neuromuscular, musculoskeletal, and integumentary impairments and restoration of these systems. Therefore, tobacco cessation counseling should be included in clinical treatment planning for patients who smoke.

Although further research is needed regarding the role of specific physical therapy modalities, such as exercise, in promoting successful cessation, we already recognize the success of other clinicians in providing services based on the USDHHS guidelines (the "5 A's" and "5 R's"), as well as the use of quit lines as a

referral source. Use of these techniques should be adopted as a component of evidence-based physical therapist practice designed to serve the best interests of our clients. Counseling and referral can take as little as 5 minutes and should not be difficult to integrate into physical therapist practice, as our profession places such emphasis on tailored, individualized patient education. Our own education, in entry-level and postprofessional forums, also will need to evolve to best meet these demands so that we may continue to refine and expand our skills as practitioners of choice for noninvasive, holistic physical wellness.

R.M. Pignataro, PT, DPT, CWS, Department of Community Medicine, West Virginia University, PO Box 9190, Morgantown, WV 26506-9190 (USA). Address all correspondence to Dr Pignataro at: rpignataro@hsc.wvu.edu.

P.J. Ohtake, PT, PhD, Department of Rehabilitation Science, University at Buffalo, Buffalo, New York.

A. Swisher, PT, PhD, CCS, Division of Physical Therapy, West Virginia University.

G. Dino, PhD, Department of Community Medicine, West Virginia Prevention Research Center.

[Pignataro RM, Ohtake P], Swisher A, Dino G. The role of physical therapists in smoking cessation: opportunities for improving treatment outcomes. *Phys Ther.* 2012;92:757-766.]

© 2012 American Physical Therapy Association

Published Ahead of Print: January 6, 2012

Accepted: December 27, 2011

Submitted: September 14, 2011

DOI: 10.2522/ptj.20110304

References

- 1 *Ending the Tobacco Epidemic: A Tobacco Control Strategic Action Plan for US Department of Health and Human Services*. Washington, DC: US Dept of Health and Human Services; 2010.
- 2 Rea BL, Hopp Marshak H, Neish C, Davis N. The role of health promotion in physical therapy in California, New York, and Tennessee. *Phys Ther.* 2004;84:510-523.
- 3 Gollust SE, Schroeder SA, Warner KE. Helping smokers quit: understanding the barriers to utilization of smoking cessation services. *Milbank Q.* 2008;86:601-627.
- 4 An LC, Foldes SS, Alesci NL, et al. The impact of smoking-cessation intervention by multiple health professionals. *Am J Prev Med.* 2008;34:54-60.
- 5 Zenzano T, Allan JD, Bigley MB, et al. The roles of healthcare professionals in implementing clinical prevention and population health. *Am J Prevent Med.* 2011;40:261-267.
- 6 Machlin SR, Chevan J, Yu WW, Zodet MW. Determinants of utilization and expenditures for episodes of ambulatory physical therapy among adults. *Phys Ther.* 2011;91:1018-1029.
- 7 Rimmer JH, Rowland JL. Health promotion for people with disabilities: implications for empowering the persona and promoting disability-friendly environments. *Am J Lifestyle Med.* 2008;1-12.
- 8 *Guide to Physical Therapist Practice*. 2nd ed rev. Alexandria, VA: American Physical Therapy Association; 2003.
- 9 American Physical Therapy Association. Vision 2020. Available at: <http://www.apta.org/Vision2020/>. Accessed January 26, 2012.
- 10 *Towards a Common Language for Functioning, Disability and Health: ICF*. Geneva, Switzerland: World Health Organization; 2002.
- 11 Bodner ME, Miller WC, Rhodes RE, Dean E. Smoking cessation and counseling: knowledge and views of Canadian physical therapists. *Phys Ther.* 2011;91:1051-1062.
- 12 Leone A. Interactive effect of combined exposure to active and passive smoking on cardiovascular system. *Recent Pat Cardiovasc Drug Discov.* 2011;6:61-69.
- 13 Harel-Meir M, Sherer Y, Shoenfeld Y. Tobacco smoking and autoimmune rheumatic diseases. *Nat Clin Pract Rheumatol.* 2007;3:707-715.
- 14 Bernhard D, Moser C, Backovic A, Wick G. Cigarette smoke: an aging accelerator? *Exp Gerontol.* 2007;42:160-165.
- 15 Ahn C, Mulligan P, Salicido RS. Smoking, the bane of wound healing: biomedical interventions and social influences. *Adv Skin Wound Care.* 2008;21:227-236.
- 16 Palmer KT, Syddall H, Cooper C, Coggon D. Smoking and musculoskeletal disorders: findings from a British national survey. *Ann Rheum Dis.* 2003;62:33-36.
- 17 Alonso JR, Cardellach F, Lopez S, et al. Carbon monoxide specifically inhibits cytochrome C oxidase of human mitochondrial respiratory chain. *Pharmacol Toxicol.* 2003;93:142-146.
- 18 Ulvick A, Ebbing M, Hustad S, et al. Long- and short-term effects of tobacco smoking on circulating concentrations of B vitamins. *Clin Chem.* 2010;56:755-763.
- 19 Kosecik M, Erel O, Sevinc E, Selek S. Increased oxidative stress in children exposed to passive smoking. *Int J Cardiol.* 2005;100:61-64.
- 20 Ozguner F, Koyu A, Cesur G. Active smoking causes oxidative stress and decreases blood melatonin levels. *Toxicol Ind Health.* 2005;21:21-26.
- 21 Bloomer RJ, Fisher-Wellman K. The role of exercise in minimizing postprandial oxidative stress in cigarette smokers. *Nicotine Tob Res.* 2009;11:3-11.
- 22 Jaimes EA, Tian RX, Raji L. Nicotine: the link between cigarette smoking and the progression of renal injury? *Am J Physiol Heart Circ Physiol.* 2007;292:H76-H82.
- 23 Anton M, Cortez-Cooper M, DeVan A, et al. Cigarette smoking, regular exercise, and peripheral blood flow. *Atherosclerosis.* 2006;185:201-205.
- 24 Rayner R. Effects of cigarette smoking on cutaneous wound healing. *Primary Intention.* 2006;14:100-102, 104.
- 25 Morita A. Tobacco smoke causes premature skin aging. *J Dermatol Sci.* 2007;48:169-175.
- 26 Barreiro E, Peinado VI, Galdiz JB, et al. Cigarette-smoke induced oxidative stress: a role in chronic obstructive pulmonary disease skeletal muscle dysfunction. *Am J Respir Crit Care Med.* 2010;182:477-488.
- 27 Wust RC, Morse CI, Haan A, et al. Skeletal muscle properties and fatigue resistance in relation to smoking history. *Eur J Appl Physiol.* 2008;104:103-110.
- 28 Adedoyin RA, Mbada CE, Odiachi AM, et al. Differences in back extensor muscles fatiguability for smoking and non-smoking athletes. *Isokinet Exerc Sci.* 2010;18:149-155.
- 29 Nelson HD, Nevitt MC, Scott JC, et al. Smoking, alcohol and neuromuscular and physical function of older women: study of osteoporotic fractures research group. *JAMA.* 1994;272:1825-1831.
- 30 Rapuri PB, Gallagher JC, Smith LM. Smoking is a risk factor for decreased physical performance in elderly women. *J Gerontol A Biol Sci Med Sci.* 2007;62:93-100.
- 31 Krall EA, Dawson-Hughes B. Smoking increases bone loss and decreases intestinal calcium absorption. *J Bone Miner Res.* 1999;14:215-220.
- 32 Law MR, Hackshaw AK. A meta-analysis of cigarette smoking, bone mineral density and risk of hip fracture: recognition of a major effect. *BMJ.* 1997;315:841-846.
- 33 Jenkins MR, Denison AV. Smoking status as a predictor of hip fracture risk in postmenopausal women of northwest Texas. *Prev Chronic Dis.* 2008;5:A09.
- 34 Castillo RC, Bosse MJ, MacKenzie EJ, et al. Impact of smoking on fracture healing and risk of complications in limb-threatening open tibia fractures. *J Orthop Trauma.* 2005;19:151-157.
- 35 Swan GE, Lessov-Schlaggar CN. The effects of tobacco smoke and nicotine on cognition and the brain. *Neuropsychol Rev.* 2007;17:259-273.
- 36 Rusanen M, Kivipelto M, Quesenberry CP Jr, et al. Heavy smoking in midlife and long-term risk of Alzheimer disease and vascular dementia. *Arch Intern Med.* 2011;171:333-339.

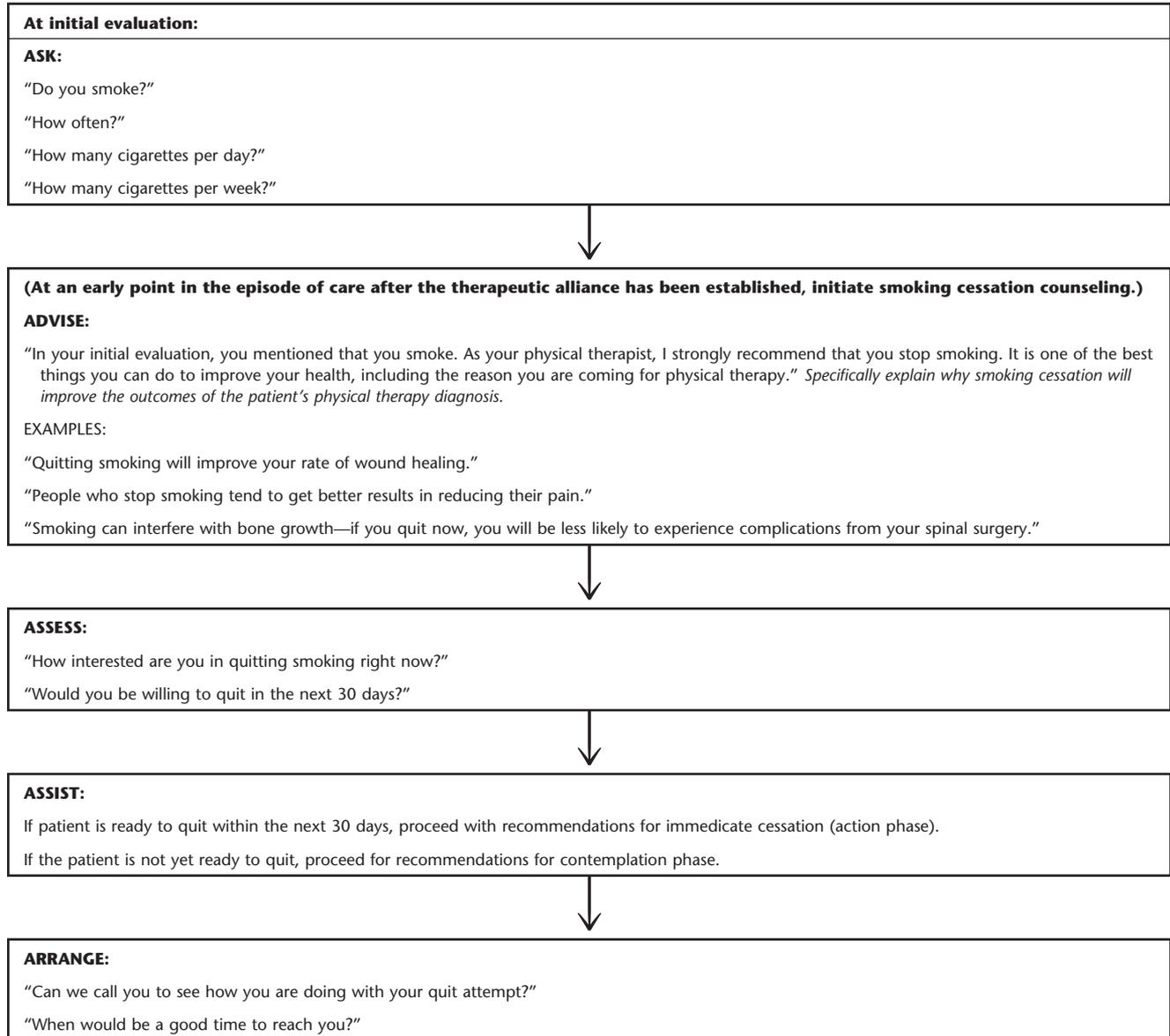
- 37 Sutjeda NA, Veldink JH, Fischer K, et al. Lifetime occupation, education, smoking and risk of ALS. *Neurology*. 2007;69:1508-1514.
- 38 Carratu MR, Coluccia A, Borracci P, et al. Smoking during pregnancy: a risk factor for peripheral neuropathy? *Dev Neurosci*. 2008;30:224-230.
- 39 Shi Y, Weingarten TN, Mantilla CB, et al. Smoking and pain: pathophysiology and clinical implications. *Anesthesiology*. 2010;113:977-992.
- 40 Richards JS, Kogos SC Jr, Ness TJ, Oleson CV. Effects of smoking on neuropathic pain in two people with spinal cord injury. *J Spinal Cord Med*. 2005;28:330-332.
- 41 Zivadonov R, Weinstock-Guttman B, Hashmi K, et al. Smoking is associated with increased lesion volumes and brain atrophy in multiple sclerosis. *Neurology*. 2009;73:504-510.
- 42 Onozaki K. Etiological and biological aspects of cigarette smoking in rheumatoid arthritis. *Inflamm Allergy Drug Targets*. 2009;8:364-368.
- 43 Weingarten TN, Moeschler SM, Ptaszynski AE, et al. An assessment of the association between smoking status, pain intensity, and functional interference in patients with chronic pain. *Pain Physician*. 2008;11:643-653.
- 44 Yunus MB, Arslan S, Aldag JC. Relationship between fibromyalgia features and smoking. *Scand J Rheumatol*. 2002;31:301-305.
- 45 Goldberg MS, Scott SC, Mayo NE. A review of the association between cigarette smoking and the development of nonspecific back pain and related outcomes. *Spine (Phila Pa 1976)*. 2000;25:995-1014.
- 46 Fogelholm RR, Alho AV. Smoking and intervertebral disc degeneration. *Med Hypotheses*. 2001;56:537-539.
- 47 Zvolensky MJ, Mc Millan K, Gonzalez A, Asmundson GJ. Chronic pain and cigarette smoking and nicotine dependence among a representative sample of adults. *Nicotine Tob Res*. 2009;11:1407-1414.
- 48 Akmal M, Kesani A, Anand B, et al. Effect of nicotine on spinal disc cells: a cellular mechanism for disc degeneration. *Spine (Phila Pa 1976)*. 2004;29:568-575.
- 49 Shiri R, Karpinnen J, Leino-Arjas P, et al. The association between smoking and low back pain: a meta-analysis. *Am J Med*. 2010;123:e7-87.e35.
- 50 Hooten WM, Townsend CO, Bruce BK, Warner DO. The effects of smoking status on opioid tapering among patients with chronic pain. *Anesth Analg*. 2009;108:308-315.
- 51 Andersson H, Ejlertsson G, Leden I. Widespread musculoskeletal chronic pain associated with smoking: an epidemiological study in a general rural population. *Scand J Rehabil Med*. 1998;30:185-191.
- 52 Dean E. Physical therapy in the 21st century (part D): toward practice informed by epidemiology and the crisis of lifestyle conditions. *Physiother Theory Pract*. 2009;25:330-353.
- 53 *Health Disparities Persist Among People With Disabilities*. Atlanta, GA: Centers for Disease Control and Prevention, US Dept of Health and Human Services; 2007.
- 54 Bodner ME, Dean E. Advice as a smoking cessation strategy: a systematic review and implications for physical therapists. *Physiother Theory Pract*. 2009;25:369-407.
- 55 Schroeder SA. What to do with a patient who smokes. *JAMA*. 2005;294:482-487.
- 56 Guilmette TJ, Motta SI, Shadel WG, et al. Promoting smoking cessation in the rehabilitation setting. *Am J Phys Med Rehabil*. 2001;80:560-562.
- 57 Heaton PC, Frede SM. Patients' need for more counseling on diet, exercise, and smoking cessation: results from the National Ambulatory Medical Care Survey. *J Am Pharm Assoc*. 2006;46:364-369.
- 58 Zhou X, Nonnemaker J, Sherrill B, et al. Attempts to quit smoking and relapse: factors associated with success or failure from the ATTEMPT cohort study. *Addict Behav*. 2009;34:365-373.
- 59 *Treating Tobacco Use and Dependence: 2008 Update*. Rockville, MD: Agency for Healthcare Research and Quality, US Dept of Health and Human Services; 2008.
- 60 *Treating Tobacco Use and Dependence: Quick Reference Guide for Clinicians*. Rockville, MD: Public Health Service, US Dept of Health and Human Services; 2000.
- 61 Fiore MC, Croyle RT, Curry SJ, et al. Preventing 3 million premature deaths and helping 5 million smokers quit: a national action plan for tobacco cessation. *Am J Public Health*. 2004;94:205-210.
- 62 McIvor A, Kayser J, Assaad JM, et al. Best practices for smoking cessation interventions in primary care. *Can Respir J*. 2009;16:129-134.
- 63 Wai EK, Rodriguez S, Dagenais S, Hall H. Evidence-informed management of chronic low back pain with physical activity, smoking cessation, and weight loss. *Spine J*. 2008;8:195-202.
- 64 Taylor AH, Ussher MH, Faulkner, G. The acute effects of exercise on cigarette cravings, withdrawal symptoms, affect and smoking behaviour: a systematic review. *Addiction*. 2007;102:534-543.
- 65 Boudreaux ED, Francis JL, Carmack Taylor CL, et al. Changing multiple health behaviors: smoking and exercise. *Prev Med*. 2003;36:471-478.
- 66 Prapavessis H, Cameron L, Baldi JC, et al. The effects of exercise and nicotine replacement therapy on smoking rates in women. *Addict Behav*. 2007;32:1416-1432.
- 67 Grove J, Wilkinson A, Dawson B, et al. Effects of exercise on subjective aspects of sleep during tobacco withdrawal. *Austr Psychol*. 2006;41:69-76.
- 68 Olchowski A, Graham J, Beverly E, Dupkanick C. Cigarette smoking, physical activity and the health status of college students. *J Appl Soc Psychol*. 2009;39:683-706.
- 69 Aván Perez C. Prescribing exercise in tobacco smoking cessation therapy [article in Spanish]. *Arch Bronconeumol*. 2009;45:556-560.
- 70 Papanthasiou G, Georgakopoulos D, Georgoudis G, et al. Effects of chronic smoking on exercise tolerance and on heart rate-systolic blood pressure product in young healthy adults. *Eur J Cardiovasc Prev Rehabil*. 2007;14:646-652.
- 71 Bernaards CM, Twisk JW, Van Mechelen W, et al. A longitudinal study on smoking in relationship to fitness and heart rate response. *Med Sci Sports Exerc*. 2003;35:793-800.
- 72 Dent LA, Harris KJ, Noonan CW. Randomized trial assessing the effectiveness of a pharmacist-delivered program for smoking cessation. *Ann Pharmacother*. 2009;43:194-201.
- 73 Studts JL, Burris JL, Kearns DK, et al. "Providers practice prevention": promoting dental hygienists' use of evidence-based treatment of tobacco use and dependence. *J Dent Educ*. 2009;73:1069-1081.
- 74 Ohtake P, Homish G. Smoking cessation counseling skills and confidence are increased in DPT students following communication skills education. Abstract of paper presented at the Combined Sections Meeting of the American Physical Therapy Association; February 9-12, 2011; New Orleans, Louisiana. *Cardiopulmonary Phys Ther J*. 2010;21:27.

Appendix.

Physical Therapist Practice Guide to Tobacco Cessation Counseling

Tobacco Cessation Counseling Guidelines

- Every patient should be asked about tobacco use.
- For people who smoke, outlines of the “5A’s” and “5 R’s” are listed below.



(Continued)

Appendix.

Continued

Action Phase

Patient reports he or she is ready to quit smoking within the next 30 days.

- Commend the patient on his or her willingness to quit and express empathy toward making such a difficult decision, for example: “I know that quitting is difficult, but I am really happy that you’ve made such an important decision. Quitting now will help you heal faster. Let’s make sure that you receive more information about smoking cessation before you leave.”
- Encourage the patient to get rid of tobacco products, put away ashtrays if quitting today.
- If the patient is not ready to quit today, ask him or her to select a quit date in the next week or two.
 - Encourage patient to make some immediate changes in smoking behaviors to facilitate future cessation: cutting back on how much he or she smokes, limiting where he or she smokes, telling others he or she wants to quit to gather social support, writing down reasons he or she wants to quit to serve as a reminder and ongoing motivation.
- Recommend materials for patient that will assist cessation.
 - Internet sites: American Cancer Society—www.cancer.org, 1-800-ACS-2325
 - American Legacy Foundation—www.americanlegacy.org, 1-202-454-5555
 - American Lung Association—www.lungusa.org, 1-800-LUNG-USA
 - Toll-free quit lines: American Cancer Society, 1-800-ACS-2345
 - American Lung Association, 1-800-LUNG-USA
 - National Quit Line: 1-800-QUITNOW (will refer caller to local resources)
- Ask the patient whether she or he is interested in pharmacotherapy; if yes, offer to contact the patient’s medical provider/physician.

Contemplation Phase

- Acknowledge difficulties in making a decision to quit smoking, for example: “That’s OK. Most people who smoke aren’t ready to quit right away. I’d like for you to give it more thought. The decision to quit can only be made by you, but I am willing to help any way that I can.”
- Follow the “5 R’s.”

<p>Relevance: Explain how smoking affects the person’s individual health, for example, for patients with an orthopedic injury, it can interfere with bone healing, contribute to osteoporosis, exacerbate pain, and affect muscle strength and endurance.</p>	<p>Risks: Include both acute-term and long-term risks of smoking (eg, disability, reduced quality of life). Also discuss environmental risks such as increased health risks to spouses, children and others exposed to secondhand smoke, including pets.</p>
<p>Rewards: Ask your patient to identify some of the major benefits of cessation (eg, better health, optimal recovery and improved physical functioning, money saved, improved sense of taste and smell).</p>	<p>Roadblocks: Spend time asking the patient about the perceived barriers to cessation (eg, withdrawal symptoms, weight gain, fear of failure) and brainstorm possible solutions.</p>
<p>Repetition: Reinforce your commitment and interest in helping the patient stop smoking. Continue to gauge his or her motivation to quit during subsequent office visits, or arrange for follow-up phone contact.</p>	

Physical Therapy

Journal of the American Physical Therapy Association



The Role of Physical Therapists in Smoking Cessation: Opportunities for Improving Treatment Outcomes

Rose M. Pignataro, Patricia J. Ohtake, Anne Swisher and Geri Dino

PHYS THER. 2012; 92:757-766.

Originally published online January 6, 2012

doi: 10.2522/ptj.20110304

References

This article cites 66 articles, 17 of which you can access for free at:

<http://ptjournal.apta.org/content/92/5/757#BIBL>

Subscription Information

<http://ptjournal.apta.org/subscriptions/>

Permissions and Reprints

<http://ptjournal.apta.org/site/misc/terms.xhtml>

Information for Authors

<http://ptjournal.apta.org/site/misc/ifora.xhtml>
