60. Counseling to Prevent Low Back Pain

RECOMMENDATION

There is insufficient evidence to recommend for or against counseling patients to exercise to prevent low back pain, but recommendations for regular physical activity can be made based on other proven benefits (see Chapter 55). There is also insufficient evidence to recommend for or against the routine use of educational interventions, mechanical supports, or risk factor modification to prevent low back pain (see ***Clinical Intervention***).

Burden of Suffering

Low back pain affects 60–80% of U.S. adults at some time during their lives, and up to 50% have back pain within a given year.[1–8] Back symptoms are among the 10 leading reasons for patient visits to emergency rooms, hospital outpatient departments, and physicians' offices.[9–11] Although symptoms are usually acute and self-limited, low back pain often recurs,[12] and in 5–10% of patients low back pain becomes chronic.[1–4,13] Back symptoms are the most common cause of disability for persons under age 45.[14] Treatment is expensive.[2,3,15–18] In 1990, direct medical costs for low back pain exceeded $24 billion. Total annual costs for back pain increase from $35 to $56 billion when disability costs are included.[3,8,18]

Many back injuries are occupational in nature. Occupational back injury is clearly related to lifting and repeated activities. Persons in occupations that require repetitive lifting, such as nursing[19] and heavy industry,[20] are especially at risk. Based on national data, occupational groups with the highest estimated prevalence of low back pain (10.1–10.5%) include mechanics and repairers of vehicles, engines and heavy equipment; operators of extractive, mining, and material-moving equipment; and people in construction trades and other construction occupations.[20]

Efficacy of Risk Reduction

Among the most commonly proposed strategies to prevent low back pain and injury are: (*a*) back flexion, back extension, and general fitness exercises; (*b*) improved back mechanic and ergonomic techniques (i.e., maxi-

mizing the efficient use of human energy in performing work); (*c*) mechanical back supports (back belts or corsets); and (*d*) risk factor modification (such as reducing obesity and smoking).[6,7,21] Clinical strategies for preventing low back pain are aimed at asymptomatic subjects both with and without a history of back pain.[13,22] The pathophysiology of low back pain and the efficacy of prevention strategies do not differ substantially in these two groups, so prevention studies that enrolled subjects with or without prior acute back pain are included in this review. The Task Force does not specifically address occupational interventions to prevent low back pain such as worker selection, changes in workplace design, or the role of the clinician in the workplace. Studies in occupational settings have been included, however, if they might be generalizable to the primary care setting.

Exercise is typically aimed at strengthening back extensors or flexors and increasing back flexibility to reduce injury risk, improving cardiovascular fitness to minimize injury and enhance recovery should injury occur, and improving mood and pain perception to reduce the impact of injury. Observational studies generally support an association between greater fitness or higher levels of physical activity and reduced prevalence of low back pain or injury, but results are less consistent regarding the effect of greater strength or flexibility on low back pain.[23–35]

Five controlled trials have evaluated the prevention of low back pain with exercise compared to no intervention.[36–41] Two of these trials evaluated back-strengthening exercises. In one trial, nurses and aides with and without a history of prior back pain were randomized to receive instructions on exercises for strengthening back extensors (during five half-hour sessions), followed by 13 months of exercise sessions at work (averaging 6 hours per month), or no intervention.[36] Intervention subjects demonstrated greater extensor strength, fewer self-reported days with low back pain, and reduced absenteeism related to low back pain; total absenteeism was not reported. In another hospital-based trial, employees with a history of low back pain during the year before enrollment were randomized to receive (*a*) 45-minute exercise sessions for strengthening back flexors, twice weekly for 3 months at work; (*b*) five 90-minute back education sessions; or (*c*) no intervention. The number of self-reported "painful months" was significantly less for subjects in the exercise group than in the other groups.[37] Total days lost from work were not reported.

Three controlled trials evaluated exercise aimed at increasing cardiovascular fitness. In the first trial, 125 industrial workers with a history of back pain were randomized to receive aerobic exercise sessions once per week at work for 18 months, or no intervention.[38] Withdrawal rates were high: 19 of the 67 controls and 21 of the 58 exercise subjects (including five who withdrew from the exercise group because of an increase in back or neck pain). Over the 18-month period there was a significantly greater

decrease in mean number of back pain episodes, and in sick days attributable to back pain, in intervention subjects compared to controls. Total sick days were not reported, however. In a randomized controlled trial enrolling nurses with a history of back pain during the 2 years before enrollment, intervention subjects attended a 5-week program combining 4 hours of aerobic exercise and 4 hours of back education daily.[39] Although study subjects had fewer self-reported back symptoms than controls at 6 months, it is not clear whether this was due to exercise, education, or both. At the 18-month followup, sick days for the intervention group had increased from baseline.[40] In a nonrandomized trial of 45 nursing aides with mild nondebilitating low back pain,[41] 15 subjects attended training to increase aerobic capacity twice weekly for 8 weeks, 14 subjects were taught "short arm" lifting techniques to protect the back, and the remaining subjects served as controls. Following the intervention, subjects in the exercise cohort had significantly improved aerobic capacity, but there was no reduction in duration or frequency of recurrent back episodes compared with controls.

Thus, most of the trials showed a statistically significant benefit from exercise, but the effects were modest and of uncertain duration. The interventions used may not be relevant to the clinical setting since all allocated work time for exercise, thus greatly increasing the likelihood of compliance. In most of the trials, the authors do not specify whether the control groups continued to work while the intervention groups were allowed time during the workday for exercise.[36–39,42] If so, the results may have been biased by the greater exposure time to work conditions associated with back injury in controls compared to the intervention subjects. A common methodologic problem is the lack of precision in specifying whether the goal was to prevent the first episode of low back symptoms, activity limitations, recurrent episodes, work absenteeism, or chronic disability.[43] Finally, the inclusion criteria and clinical outcomes of the studies differ and therefore are difficult to compare. Thus, the evidence regarding the effectiveness of exercise in preventing low back pain is inconclusive.

Orthotic devices such as back supports (corsets or back belts) are frequently used to prevent back pain and injuries.[44] These devices may be prescribed by physicians, but individuals generally obtain them on their own or from employers. Several studies have attempted to evaluate back belts in the occupational setting. In a controlled trial, 642 airline baggage handlers were randomized to one of four groups: back belt only, training only, back belt and training combined, and control.[45] Previously injured workers were included, but the proportion of workers with prior back injury in each group was not reported. Back belts were to be worn only at work. The 1-hour training session included information on back mechanics, proper lifting techniques, and warm-up exercises. At 8-month followup no statistically

significant differences in mean rates of work loss were observed between subjects in either the belt only group or the belt and training groups and controls. When all subjects randomized to use a back belt were aggregated and compared to controls, the intervention group showed a trend toward increased frequency of back pain. Results are difficult to interpret, however, because analysis was performed according to intervention received rather than intention to treat, and 58% of subjects assigned to one of the back belt groups who had not yet developed back pain stopped using the supports before the end of the study. In a trial of 90 warehouse workers,[22] one third were randomized to a 1-hour educational intervention emphasizing back biomechanics and were provided with a corset for use during work hours; one third received education only; and one third received no intervention. There were no differences in productivity or injury rates, but subjects in the corset plus education group had a significantly greater decrease in days lost from work compared with controls (2.5-day decrease vs. 0.4-day increase). These differences in outcomes occurred only in the subgroup of previously injured workers, suggesting that prophylactic bracing may only benefit those with a history of back injury. A retrospective cohort study assessed 1,316 workers at an Air Force base where policy mandated use of the belt for all employees with a history of back injury whose position required frequent heavy lifting. Those who wore belts were the intervention group while employees in comparable positions who chose not to wear belts were controls, suggesting likely selection bias. The risk of low back injury was reduced 40% among those using back belts, but this difference was not statistically significant. Costs of injury sustained while wearing a belt, however, were substantially higher than if injured without a belt.[12] Thus evidence is inadequate to show a benefit from back belts, and suggests possible harms. In addition, poor compliance in these and other studies[46] raises the question of whether subjects will routinely use corsets for prevention of back pain.

Epidemiologic evidence suggests that several modifiable risk factors, including smoking, obesity, and certain psychological profiles, predispose subjects to develop low back pain.[2,4,6,7,47,48] Risk factors are presumed to exert their influence either by increasing a subject's risk of a precipitating event, or by increasing the chance that such an event will be perceived as painful or disabling. Cross-sectional and prospective studies have consistently shown that smokers have a 1.5–2.5-fold increased risk of back pain compared to nonsmokers.[21,23,24,30,49–57] A biologic basis for this risk is suggested by a recent study of identical twins discordant for smoking, showing that smoking increases degenerative changes of the spine.[58] Prospective and cross-sectional studies have also associated obesity with back pain, although one study did not support this association.[21,23,24,59] The association may be stronger in women.[23] Based on these associations some authors have recommended smoking cessation and, for obese persons, weight loss

to prevent back pain,[6,21] but direct evidence to support these recommendations has not been identified. Psychological risk factors, including depression, anxiety, and perceived high occupational stress, have also been associated with the development of low back pain.[23,24,54,60–63] Again, there is no direct evidence that modifying these factors reduces low back pain.

Effectiveness of Counseling

Education is the most common back pain prevention strategy used in the occupational setting and may also be used by clinicians.[44,64,65] Education through "back school" training, including information on back biomechanics, preferred lifting strategies, optimal posture, exercises to prevent back pain, and stress and pain management, has been effective in reducing employment-related injuries and relieving chronic low back pain.[66–70] Such programs are delivered in the workplace, however, and are not necessarily generalizable to education in the clinical setting.[71] Other types of education programs that are potentially relevant to clinicians have also been evaluated. The studies all included patients with and without prior back pain, generally had small sample sizes, and except for one, were conducted in the workplace. As it would be difficult to do a blinded trial on back education, and since patient reports of low back pain are inherently subjective, all the results have a potential for subject bias.

There have been five randomized controlled trials of educational interventions for the prevention of low back pain. Already described above, two of these combined education with exercise interventions, and one combined education with back supports.[22,37,39] In the trial[37] of hospital employees randomized to either exercise, back education, or control groups, both exercise and education groups' knowledge of body mechanics improved. The education group, however, had no reduction of low back pain episodes. In the trial[39] randomizing nurses to either exercise and low back education or to no intervention, intervention subjects had greater improvements in self-reported pain, fatigue, and activities of daily living at 6-month followup; the effects of education, however, could not be separated from those of the exercise intervention. The previously cited randomized trial[22] that evaluated both lumbar supports (corsets) and back education for warehouse workers included a group that received only a 1-hour educational program stressing proper lifting techniques. Those in the educational program had significantly greater knowledge about low back pain than did controls at 6-month followup. Patients with a previous history of injury had lower injury rates and days lost from work after the education compared with controls, while there was no effect on subjects with no history of back injury. In another randomized controlled trial in U.S. postal workers, knowledge about back pain was

higher in those attending an educational program, but self-reported frequency of "tired backs" was no different at 2.5-year followup.[72] In the fifth trial, teenagers enrolled in a summer work program were randomized to a 1-hour session providing information about proper lifting techniques and two on-the-job feedback sessions, or to simple orientation sessions. While the intervention subjects were rated as having better body mechanics than controls at 4-week followup, followup data were not available beyond 4 weeks and the incidence of back pain was not measured.[73]

None of six nonrandomized trials and one case-control study that evaluated educational interventions found a statistically significant difference between control and intervention subjects in the incidence or duration of low back injuries, pain episodes, or, in one study, absenteeism.[41,74–79] One of these, conducted on nursing students, did find that students in the intervention group had significantly better patient handling skills when evaluated by nonblinded observers.[75] Nurses observed to have better transfer skills (regardless of study group) while in school had significantly fewer back injuries than did others (2% vs. 24%), but intervention and control groups did not differ in the occurrence of back pain. Thus, educational interventions do increase knowledge and may improve lifting behavior, but there is little evidence that these changes prevent low back pain or injury.

Two studies have evaluated educational interventions for low back pain prevention during pregnancy. In a nonrandomized trial, 85 pregnant women attended two 1-hour sessions in which the causes of back pain, favorable working postures, and lifting strategies were discussed.[80] Ninety pregnant women who enrolled in the clinic after the intervention program or enrolled in a nearby clinic served as controls. Baseline rates of low back pain were similar in both groups. Following the educational program, women in the intervention group had significantly less self-reported "troublesome or severe" backache than controls (32% vs. 54%). The benefit continued until delivery, but subjects were not followed further. In another controlled trial, 407 pregnant women were assigned, based on birthday, to no intervention, to two 45-minute back school classes, or to five individualized 30-minute lessons with the same content as the second group.[81] Overall, the interventions had no significant effect on the incidence or intensity of back pain. In the subgroup of women who had back or posterior pelvic pain, however, both interventions reduced the pain and the individualized lessons reduced sick leave taken and the intensity of pain reported at 8 weeks postpartum. The study has methodologic weaknesses in both analysis and reporting.

There is currently limited evidence that counseling patients to incorporate regular physical activity into their daily routines will have a positive effect on their behavior (see Chapter 55 for details). Establishing the effectiveness of counseling about modifiable risk factors to prevent low back

pain also requires further study. Multiple studies have shown that clinician counseling can substantially increase the rate of smoking cessation (see Chapter 54). Similarly, a number of interventions have been proven effective in inducing short-term weight loss (see Chapter 21). There is also effective treatment for diagnosed depression (see Chapter 49). There is little evidence, however, specifically addressing the effectiveness of counseling patients about smoking, obesity, or psychological conditions as it relates to the prevention of low back pain.

Recommendations of Other Groups

The American Academy of Family Physicians recommends "back-conditioning exercises" for persons aged 19–64 years who are at increased risk for low back injury because of past history, body configuration, or certain types of activities.[82] This policy is currently under review. The Agency for Health Care Policy and Research (AHCPR) recommends patient education about low back symptoms and, in occupational settings, back school. AHCPR has also issued recommendations on the management of acute low back problems.[43,83] The American Academy of Orthopaedic Surgeons' "Lift it Safe" program recommends specific lifting techniques to prevent back pain, and exercises to minimize problems with back pain.[84] The National Institute for Occupational Safety and Health (NIOSH) does not recommend the use of back belts to prevent injuries among workers who have never been injured. NIOSH recommends that the most effective means of minimizing the likelihood of back injury in the workplace is to develop and implement a comprehensive ergonomics program.[85,86]

Discussion

With low back pain affecting the majority of adults in the U.S. at some time during their lives, the associated direct and indirect costs make it one of the most expensive ailments in industrialized countries. At present, studies on the prevention of low back pain and its risk factors do not establish a benefit from intervention. Exercise may be mildly protective against back pain, but data are unavailable beyond 18 months. The best results appeared to occur with comprehensive programs that combined exercise training with other educational interventions. Such intensive programs are more typical of work place interventions, but clinicians might expect similar results if resources were available to duplicate the interventions evaluated in published research. Aerobic exercise appears to be at least as effective as exercises aimed at trunk muscles, and can be readily recommended on the basis of other proven benefits (see Chapter 55). The studies on back education offer minimal support for the use of such strategies

in low back pain prevention. Although some educational interventions may have a modest effect, the variability of the interventions and the fact that none of the studies was conducted in typical clinical settings make it difficult to recommend a specific intervention that might be effective in practice. With respect to corsets or back belts, the evidence is contradictory and hence insufficient to make any recommendation at this time. Indeed, the largest studies suggested that mechanical supports may increase the risk of low back pain and the cost of injury in some individuals. Finally, no studies have examined the effect of modifying smoking, obesity, or psychological factors on back pain risk.

CLINICAL INTERVENTION

Although there is some evidence that exercise (flexion, extension, aerobic, or fitness) protects against the development of low back pain, the effect is modest and of unknown duration, and the interventions have not been demonstrated in typical clinical settings. Thus, there is insufficient evidence to recommend for or against counseling patients to exercise specifically to prevent low back pain ("C" recommendation). Recommendations for regular physical activity can be made on other grounds, including its proven efficacy in preventing coronary heart disease, hypertension, obesity, and diabetes (see Chapter 55). There is insufficient evidence to recommend for or against educational interventions or the use of mechanical supports in the prevention of low back pain ("C" recommendation). Given some evidence that mechanical supports may increase the risk of low back pain, recommendations can be made against their use except in the context of comprehensive programs where their use can be carefully monitored to avoid injury. There is insufficient evidence to recommend for or against risk factor modification specifically for the prevention of low back pain ("C" recommendation). Screening for obesity (see Chapter 21) and counseling to prevent tobacco use (see Chapter 54) are recommended based on proven benefits unrelated to low back pain.

Worksite screening and job placement practices are beyond the scope of this report (see NIOSH recommendations[85–87]).

Note: See the relevant background paper: Lahad A, Malter AD, Berg AO, et al. The effectiveness of four interventions for the prevention of low back pain. JAMA 1994;272:1286–1291.

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