Three Different Treatment Methods on Rehabilitation of Patient with Low Back Pain

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Abstract: The purpose of present research is to determine the effects of three different treatment methods on rehabilitation of patient with low back pain. In this research, 120 patients with chronic low back pain (having at least 3-m history of low back pain) were selected as statistical sample and treated after passing the stages of screening with x-ray, MRI, and medical tests. The level of patient's pain (by using Quebec Back Pain Disability Scale) as well as the range of motion on lumbar area measure during pre-test period. Then patients were randomly placed in one of treatment groups: selected treatment method (group 1; n=40); Williams exercise (group 2; n=40); McKenzie exercise (group 3; n=40). 10 weeks were considered as therapeutic course for all three groups. Post-test was performed at the end and 1 -m after the treatment period. A general linear model repeated measures analysis of variance (ANOVA), toky test, two dependent groups test (t-test), mann-whitney u, and kruskal-wallis H, were use for data analysis. Results showed that some statistically significant differences in mitigating the level of pain and range of lumbar motion were observed for three groups (p<0.01). Indicating that selected treatment method (group 1) has better effects on mitigating the level of pain and increasing range of lumbar motion; so remaining treatment positive effects in this group (group 1) after 1- m was more than another groups (p<0.01). Gender has no statistically significant effect on rehabilitating programs for patients with low back pain. The conclusion of this research indicates that the complex treatment method: especial exercises, hydrokinesitherapy, massage therapy and physiotherapy has effective for treatment of low back pain patient.

Key words: chronic low back pain, exercise therapy, hydrokinesitherapy, physiotherapy, Williams exercise, McKenzie exercise, rehabilitation

INTRODUCTION

60 – 80 percent of people affected by once to back pain. This illness is the most important cause of limitation for people under 45 years old and it is the most important cause of weakness for people over 45 years old. The cure expense back pain in the united state is 20 -50 billion dollar in the year (Steven Stoltz, M.D., 2003).

Back pain is the most expensive problem health in the society. It has any cure yet such compounds as advance in the different methods in science such as (medication, physiotherapy, surgery, acupuncture, TENS) (Emami, M.J., 2002; Mohseni-Bandpei, M.A., 2001; Mohseni-Bandpei, M.A., 2000; Mohseni-Bandpei, M.A., 2001; Mohseni-Bandpei, M.A., 2000).

75 percent of people the affected by acute back pain improve after 6 week. And 10-25 percent of remainder is in the back pain risk chronic. According to physiotherapy praise the back pain -which continue more than 3 month is called chronic. The back pain has connection with scientist spiritual and somatic such as headache, sore throat and stomach ache (Anonymous, 2003; Jones, G.T., 2003; [No authors listed], 2003; Watson, K.D., 2005).

Nowadays exercise therapy has been attention for patients with low back pain (Farrell, J.P., 2000; Hayden, J.A., 2005). Recently research it shown that flexibility and strength exercises are useful for back pain in the daily program and it used to for abdominal muscles, trunk extensors and lower extremity muscles.

back pain patients; and it is not useful for patients affected by back pain in acute stage (Tulder, M.W., 2000). Doing exercise is so much important that the different exercise program is presentation by researcher.

The McKenzie and William exercises are special place among other exercises. And it used for patients with chronic back pain ordinary (Nasery, Nasrin, 2002). The Williams exercises are the most emphasis on the support and pulling to big muscles such as latissimus dorsi and hamstring. These muscles have role primary movement (hamstring) or stability (Latissimus dorsi).

Supporting and pulling of the muscles is useful for muscles establish and back pain improvement. McKenzie believe to set body the wrong position cause to back pain and to low back lordosis. This position caused to more pulling of soft tissues, so this is caused to pain. He believes that the pain would be well with correction of these unusual positions (Nasery, Nasrin, 2002).

According to roles of McKenzie and William exercises and study about used exercises practice in different source researcher it seems the method and kind of muscles that use by connected researcher is different. Much electromyography study show these exercises influence in deference muscles.

The end aim of all exercises therapy program is avail movement possibility and return nature function free from any pain. It seems the treatment role of use William and McKenzie exercises is different by attention to exercises aim. So plan to this question what kinds of two methods are more useful than the other.

It is ambiguous presentation of an outwardly complex and collection that it can have functioned effected. Therefore researchers decided to search effect of two methods exercises. Treatment methods William and McKenzie that do a treatment method selected according to bases and clinic experiments, and examine all of three methods affected.

Methods:
This research is one of half the research experience that is done with tested clinical and interloping. The statistical society of this research is all of ill affected by chronic back pain that refer to physiotherapy clinic of marwan city.

Subjects:
120 of patients who affected by chronic back pain (61 man and 59 women) from society which reference to physiotherapy clinic from doctor and advertise their satisfaction for participate in research. They were selected on group research tested.

The first group was selected treatment method (The patients do complex program selected). The second group was Williams group (the patients do Williams exercises). The third group was McKenzie group (the patients do McKenzie exercises).

The patients of three groups were isotropic view point (age, pain intensity and kind) by Quebec Back Pain Disability Scale. Condition entrance to research in three groups was: don’t have systemic ill, surgical, hit to spinal column, don’t have disorder structure in spinal column (spandolisis and scoliosis more than 10 degree), disease articular and nervous muscular, experimentation based upon pressure to nervous roots, disease systematic, osteoporosis, painful arthritis, diseases inflammatory rheumatism, cancer and pregnant, nonexistence sharp pain and neurological marks in lower extremity.

Equipment:
For measurement pain of patients was used standard questionnaire Quebec Back Pain Disability Scale. Used for measure range of motion spinal column from anthropometry methods. For this purpose it measured in three situations range of motion of spinal column. It pre-test and post-test and was compare together. The situations which measured with help of spinal column in waist were:

In standing position wanted from patients that bend body forward with straight knees. Part and try to near their hands to ground. In this position it was computed distance middle finger to ground.

In lateral flexion body the distance was counted between middle finger to ground and register for two sides separately.

The patients were laid up above bed supinely and he tries to bend his knees without helping his hands and his head. Then he brings it near them to his breast. In this position computed the distance upper knee to tip of breast. (On various two fixed point).

Execution Style:
All of the patients who reference chronic low back pain (CLBP) reference to treatment clinic was selected were contrasted to back pain 3 month or more approximate. All stages sifting was done with radiography help
In the first stage the subjects were placed in the 3 lower groups after doctor satisfaction coincidence. For first group a chosen selected treatment method (n=40), a treatment complex period containing; specialized exercises therapy, hydrokinesitherapy, physiotherapy and massage; for second group (n=40) William exercises and physiotherapy; for third group (n=40) McKenzie exercises and physiotherapy was done. For all 3 group was given a equal program including: TENS for 20 minutes with 5 Hz and duration 150- 250 micro second, hat pack for 5 minute and Ultrasound with 1 watt intensity upon square centimeter for all groups 10 weeks and every week 3 sitting. Every treatment sitting for 2 and 3 groups was being done in 45-60 minutes. For first group 25-30 minutes exercises therapy, 30 - 45 minutes hydrokinesitherapy in water hot pond (30-32 centigrade), Physiotherapy and at last massage was done. Among treatment period the exercises of all groups was done in basis situation for forestalling much stress to back and have more balance.

**Exercise Programs:**

**A) Selected Treatment Method (First Group):**

The selected treatment method group was done in 3 phase: The first phase (ready stage from first week to end of second week), the aim of this stage is decreases pain. Execution style in this stage is Lind up: doing special exercises (breathing exercises for invigoration breathing muscles, decreases disc clops and decrease pain and pulling exercises in salon); hydrokinesitherapy is (walk in water, to dunked) and physiotherapy and massage. Second phase (function stage from third week to seven week), General aim in this stage is increase for endurance and strength in back muscles and increase movement in CLBP patient. Execution style in stage is: Special exercises strength exercises including 3 set and 5 movements and the repetition would be more. Endurance exercises (it begin in 7 second and it end in 15 second and every motion was done 3 times (With regard basis overload; the range of motion would be increase). And stretching exercises was done in the saloon (In the beginning the time for keeping is 3 to 5 second every movement was done in 3 times and in 3 set; It increases with patient ability the time for movement increase too). Hydrokinesitherapy is (walk in water, pedals bicycle, run) and Physiotherapy and remedial massage.

The third phase (rehabilitation-coordination stage from 8 week to 10 week), the generation aim in this stage is increase strength, flexibility; coordination of nervous–muscles for this stage is Lind up: Special exercises including: strength exercises, Endurance exercises and coordination Nero-muscular, hydrokinesitherapy, physiotherapy and massage therapy. The time for doing flexibility exercises 15-30 second and in strength exercises in this stage is 3 set 10 movements and coordination Nero-muscular in the 3 set 5 movements. In the end of every stage clinic examination and body assessment was done specialists. Then after improvement and get aims, he enters to next stage. After finishing, the back examination was done.

**B) William’s Treatment Group:**

Treatment in this stage is: physiotherapy with intensity and repetition and standard exercises; they are: Partial sit up: in this way the sick laid up supine and the knee and leg and sole are on the ground. (Crook lying situation) the hands are forward. And the patients sit down slowly. The knee separate a little. It is better to do this exercises changly. It means back down. The patients come back with bending knee and leg and he gets supine situation.

Posterior pelvic title: In that, same situation the patient gets a pillow under his head. Then it is fixed a curvature in head and body. We put our hand under back of sick and we want him to press to our hand with muscles stomach contraction. In addition, he filtrate his back. In this position, he put up his bottom.

Knee to chest: in the supine situation the patient get under knee and he near his knee to breast. The shoulder can pick up from ground.

Hamstring muscles pulling exercises: the patient sit down on the bottom with filtrate the feet and pulled. Then he tries to reach his hands to feet. Or cross from them.

Flexor leg muscles pulling exercises. The patient is in the start situation. And one foot to forward and the other foot to back. Then he sets his hands on the ground.

Strength quadriceps: the patient is in the stand up position and he holds his hands in front of his body filtrated. (matias test) then he sit down gradually (Nasery, Nasrin, 2002).

**C) McKenzie Treatment Group:**

Rehabilitation in treatment McKenzie group is including physiotherapy and McKenzie exercises. Standard McKenzie exercises are: Lying face down exercises: in the sleeping on stomach; the arms turn to beside body and head. And was wanted from patient to breathe deeply? And then lame him completely (For 4-5 minute)
to remove rear stress. This exercise was educated before doing the other starter exercises.

Lying face down in intention exercises: This exercise should be after the first exercises. And it is according to: the patient lay up in the stomach position. And the patients stand up on arms with stress that was given to elbows. Don’t be contraction in the back and extension; Movement was done passive and by elbows and hands stress. The elbows must be under shoulder surface. In this expression he breathes several breaths. And then the sick lame him (for 4-5 minute). This practice is kind of starter helping. And it used in the acute disk hernia cases.

Extension in lying exercises: the sick in the sleepy on stomach hold up his hands under shoulder. And he gets up on them (position press up). Sure it done until the pain allows. This situation should be hold 1-2 second. This exercises is the most important movement in the acute back pain and it is kind of starter helping. Every movement was done in every time 10 instances and during the day it was done 6-8 times repetition. The movement of back should be passive.

Extension in standing: in the stand up position; the feet separate from each other quant we shoulder width. Then the hands was set in the back and bend to backward and was hold the body in this situation for 1-2 second.

Flex in lying: in the supine situation as third William practice do near hands to breast and it hold 1-2 second. The hands get around knees and it continued while the pain allows. Then it returned to the first situation. In this practice the head shouldn’t up from bed. (Against William practice the head was lift and it got under knees too) This exercise was done 5-6 times in every time and 3-4 times in the day. The flexion practice was done after the first practice third. If it is without pain do number 6 practice?

Flexing in sitting exercises: it was wanted from the sick to sit on the chair in the position that knees are separate from each other. And then he reaches the hands among his feet. It is possible to get ankle with hands. This exercises 5-6 times in every instance. And 3-4 times in the day. This movement should do after practice number 3 and while the 5 weeks went from practice number 5 (Nasery, Nasrin, 2002).

**Statistics Methods:**

After the first collected; to analyzing many aims variance data and assign different changeable it preceded (MANOVA), toky test; depended two groups (t test); u man – Whitney; Kruskal –Wallis H; with use from data analyzed.

All of them statistics accounts were done with spss software.

**Results:**

The participants of this research are 120 patients. They have chronic low back pain. From this number 61 patients were men and 59 patients were women (table 1). All of the patients were in the one of the trial group (each group n=40) the first group were 21 man and 19 women and the second group were 21 man and 19 woman and the third group were 19 men and 21 women.

General specification patients in every group were given in table 2. Generally the age scope of experienced was 49 year (16 - 65 old). And the average of them was 34.6 year. The average high of them was 166.84 centimeter. And the average weight of them was 72.67 kilogram. The average pain of the entire 3 group in pre-test examination was 54.44. This result shows that the back pain was chronic. In post-test after treatment and a 1 month after finishing treatment the patient pain reach to (25.02 and 33.40). And it shows that the patients have a little pain and this pain remained until a month oust from finishing remedial stage.

<table>
<thead>
<tr>
<th>Table 1: The number of participation patients in this research.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
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<td>-----------</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Group 1 (selected treatment method)</td>
</tr>
<tr>
<td>2 Group (Williams exercise)</td>
</tr>
<tr>
<td>3 Group (Mckenzie exercise)</td>
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<tr>
<td>Mean of three group</td>
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</tbody>
</table>
Table 2: General specification patients in three groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (selected treatment method)</td>
<td>Male</td>
<td>21</td>
<td>52.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td>2 Group (Williams exercise)</td>
<td>Male</td>
<td>21</td>
<td>52.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td>3 Group (McKenzie exercise)</td>
<td>Male</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>21</td>
<td>52.5</td>
</tr>
</tbody>
</table>

Table 3: Amount pain in pre-test and post-test

<table>
<thead>
<tr>
<th>Group</th>
<th>High (cm)</th>
<th>weight (kg)</th>
<th>Age (year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (selected treatment method)</td>
<td>0.23</td>
<td>165.87</td>
<td>73.93</td>
</tr>
<tr>
<td>2 Group (Williams exercise)</td>
<td>1.68</td>
<td>74.40</td>
<td>33.80</td>
</tr>
<tr>
<td>3 Group (McKenzie exercise)</td>
<td>1.66</td>
<td>69.67</td>
<td>38.73</td>
</tr>
</tbody>
</table>

Result of this study showed that to have a different significant among selected treatment groups (the first group) with McKenzie and William methods in rehabilitation of pain patients. In the selected group the pain decreased about 68.2. The average of pain in the McKenzie and William’s group was 46.25 and 47.42. The average of staying pain in all of three groups after a 1 month (table 3) shows the selected treatment method group is better than the other groups. The examination of research shows the 3 groups of treatment in rehabilitation pain patient is useful (p~0.01). In rehabilitation ROM the selected method and William’s groups have effect on the rehabilitation of patients (p~0.01). In the McKenzie group hasn’t different significant in rehabilitation patients for improve flexion of trunk. For the improve movement in flexion situation of knee and leg in supine case (p~0.05); and in lateral body flexion was show different significant (p~0.01) (Table 4).

With helping toky test and statistics group it distanced between selected treatment method with McKenzie and William group has found a statistics difference significant in level p~0.01 (table number 4).

The result of MRI shows treatment groups (special group 1) was increase in diameter of muscles low back special multifidus muscle (fig 1-5).

Fig. 1: A scout view representing the three standardised views positioned accurately along the upper end plate of L3 and the upper and lower end plate of L4.

Fig. 2: The cross sectional area of the multifidus muscle was measured on the transaxial view. The outlines of the region of interest were identified by cursor on the computer screen.
Fig. 3: MR images and corresponding MR spectra of fat content of multifidus muscle in patient with chronic LBP.

Fig. 4: MR image and corresponding MR spectrum of left multifidus muscle in a symptomatic 40-year-old woman.

Fig. 5: Voxel positioning on MR image and corresponding MR spectra of multifidus and longissimus muscle in a 55-year-old man.

According to result although clear increase ROM after treatment stage groups. But the most increase was in movement section of spinal column in selected method group. After selected method group William group has a better situation. And in the end was McKenzie group. This is reason for emphasis on improve ROM patients and more time in selected method group.

Conclusion:

The ready research result shows the decrease of pain in selected treatment method about 68.20. The results of this study has unity with research by Tolder et al (2000); L.A Danneels et al (2001); Mataleh, Alireza (2005); Samadi poor et al (2005); Samadi poor (2004); Farahpoor et al (2005); Yazdani et al (2004).

The mean of pain in McKenzie and William's group were 46.25 and 47.42. This is unity with Samadi poor et al (2005), Samadi poor (2004) and Giasy (2006). The reason for decrease of pain in selected group regade to the other groups is specially exercises, hydrokinesitherapy, physiotherapy and massage and be treatment complex in this group. This research has unity with research samadi por and coauther (2005), samadi por (2004), mataleh; alireza (2005) and giasy et al. From the other view, decreasing of pain in patients in McKenzie and William group was until exercises doing time. And after a 1 month it decrees too much of them.
According to research results although was seen increasing range of motion after treatment group stage; but the most increase was in the ROM spinal column it communicated with selected treatment method. After selected treatment method, the Williams group has a better situation. In addition, in the end was McKenzie group. This is reason of that the emphasize was on the rehabilitation ROM topic section of patient refunction. In addition, the second reason was more time in the selected treatment group. However, in the McKenzie and William's group do not be attentions to this section.

Table 4: Rehabilitation (increase ROM) of patient CLBP

<table>
<thead>
<tr>
<th>Group</th>
<th>Position</th>
<th>Mean (cm)</th>
<th>t</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group1 (selected treatment method)</td>
<td>Trunk flexion</td>
<td>Pre-test</td>
<td>27.4</td>
<td>7.764</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (right)</td>
<td>Pre-test</td>
<td>40.13</td>
<td>5.620</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>24.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (left)</td>
<td>Pre-test</td>
<td>41.53</td>
<td>6.951</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>28.40</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supine Flexion of hip and knee toward the chest</td>
<td>Pre-test</td>
<td>30.60</td>
<td>5.522</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>20.40</td>
<td></td>
</tr>
<tr>
<td>Group2 (Williams exercise)</td>
<td>Trunk flexion</td>
<td>Pre-test</td>
<td>23.67</td>
<td>6.775</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>14.07</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (right)</td>
<td>Pre-test</td>
<td>48.53</td>
<td>7.888</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>40.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (left)</td>
<td>Pre-test</td>
<td>47.93</td>
<td>9.384</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>41.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supine Flexion of hip and knee toward the chest</td>
<td>Pre-test</td>
<td>26.33</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>19.87</td>
<td>8.711</td>
</tr>
<tr>
<td>Group3 (McKenzie exercise)</td>
<td>Trunk flexion</td>
<td>Pre-test</td>
<td>24.67</td>
<td>1.297</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>22.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (right)</td>
<td>Pre-test</td>
<td>47.13</td>
<td>3.546</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>41.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lateral flexion (left)</td>
<td>Pre-test</td>
<td>46.73</td>
<td>3.441</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Supine Flexion of hip and knee toward the chest</td>
<td>Pre-test</td>
<td>23.33</td>
<td>2.843</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>19.33</td>
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</table>

* = p~0.01  ** = p~0.05

Although the McKenzie group in the decrease of pain has better situation ratios William group. But in the improve of ROM the William group was better. And it is possible for emphasizing William on the flexion exercises and McKenzie on the extension exercises. In the flexion trunk, position did not see significant different in pre and post-test in McKenzie group, this result has unity with Samadi poor et al (2005), Samadipoor (2004) and Mataleh (2002).

According to finding research's sex do not have effect on the rehabilitation program. And it be could for equal effects pattern of two sexuality ratios to rehabilitation programs. This result has unity with Mokhtari nia and Gohar pi research (2001,2005). The rate satisfaction and improve life style patients was bin from selected treatment method, and this is caused to positive effect of exercises practice on the mental conditions, improving self confidence, decreasing of more weakness, to be more motion and using of rehabilitation complex the different aspects was attention in it.

The exercise therapy in the selected treatment method (exercises compound) caused to strength muscles internal Oblique, external Oblique, multifidus, extensors trunk and rectus abdominis, this strength will complete with increase in the muscles diameter (especial multifidus); but in the two other group this strength is less. The activity of this muscled caused to increase stability with flexibility and control of movement inter vertebra better; in low back especially. Adding to it exercise therapy caused to increasing of endurance, absence of tired, strength, coordination, stability of static and dynamic, Nero-muscular control and improve of patterns movement; and this is obtained by this research. This finding unity with many search of researchers. Sitdowning time increasing, stand up and walk without pain, role in bed without pain are targets of improving that has reported in the group 1 research.

In addition, the ready research shows the improving movement in the McKenzie and William exercises is more than in static position, and more of the effecting was gone after period rehabilitation finishing. But in the selected treatment method the improving was in the dynamic position that it caused to remaining positive effects of this exercises.
Therefore according to finding results we can say that the selected treatment method that is a systematic and complex research, including specially exercises proportional pack pain, hydrokinesiotherapy, physiotherapy, and massage therapy, it affected on the patients’ low back pain; so this research is necessary for function complex rehabilitation of low back pain patients.

REFERENCE

Mataleh, Alireza, 2005. Comparison three resistance exercises and unity and shape them to improve of pain. Iran J med, Hamaddan University, 2(36) 12: 58
Mokhtarynia, H.R., Sh. Gaohar pay, 2005. The role static and dynamic endurance in muscles low back. 3th conference physiotherapy Iran, Tehran.
[No authors listed], 2003. What to consider when a child has low back pain. Child Health Alert, 21: 2-3.
Steven Stoltz, M.D., 2003. Assistant Clinical Professor of Medicine. UCSF-Fresno.