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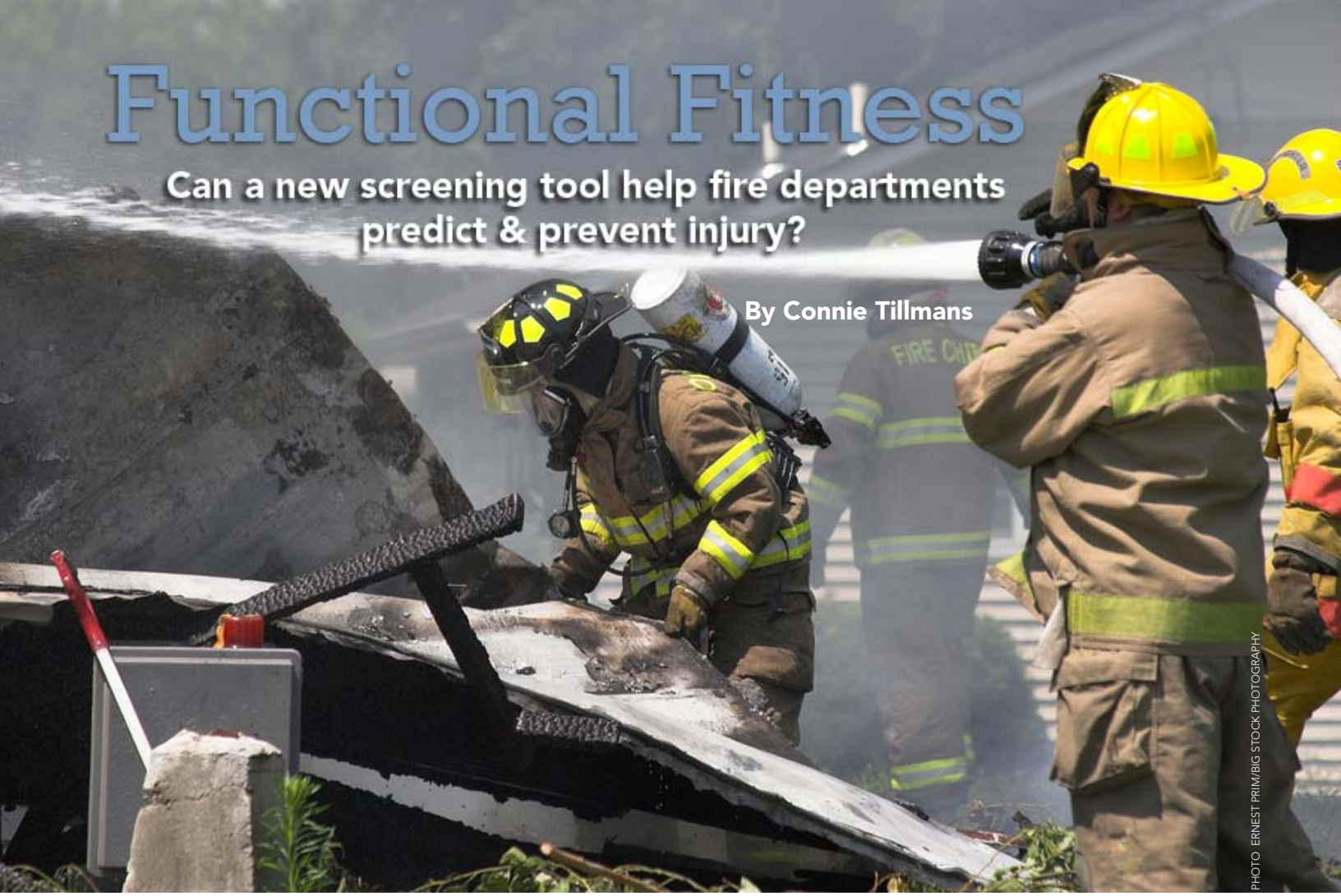
# Functional Fitness

## Can a new screening tool help fire departments predict & prevent injury?

**By Connie Tillmans**



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I recently spent 15 months working in an outpatient physical-therapy clinic. During that time, I worked with many injured firefighters. On one particular day, I overheard one of them remark, "Brunacini used to say the fire department takes better care of its trucks than its people." It is unfortunate, but the fire service is not alone in its frustration regarding injured personnel. Although athletic teams and industries might utilize pre-participation physicals and performance testing, neither of these appears capable of assessing human durability or predicting injury.[1] To augment these types of tests, fitness and medical professionals are now beginning to assert that a qualitative movement standard may be the missing variable.[2] How fast you can run a 40-yard dash or how much weight you can squat are measures of performance and can provide us only *quantitative* information. The piece that might be missing is the ability to rate and rank movement quality independent of fitness and performance. It has become apparent that we must recognize the difference between movement *capacity* and *movement competency*.[3]

The Optimum Performance Pyramid shown in Image 1 illustrates the idea that functional movement patterns are necessary to support movement capacity and specialization.[4] Research findings indicate that taking movement quality into consideration could be the key to reducing the rate and severity of injury.[5, 6, 7] The Functional Movement Screen (FMS) offers the fire service the opportunity to take a giant step forward in protecting its personnel and its budgets.

## FMS: The Missing SOP?

The idea that a screening tool can have predictive value is not new. Blood pressure and blood work can indicate when an individual is at risk for a heart attack or stroke, even when the individual is asymptomatic. Blood-pressure and blood-lipid measurements allow a physician to intervene before a life-threatening event occurs. FMS was designed with the same idea in mind: Identify those who are at risk of injury and implement corrective strategies. This group of seven tests exposes mobility and stability deficiencies, painful patterns, and differences between the right and left sides, which allows them to be addressed before problems arise.[8] (Please click the paperclip at left to view the seven tests that make up FMS.) Fundamental and higher-level movement patterns are assessed, with correction of the fundamental movement patterns taking precedence over the higher-level patterns. Established criteria allow the tester to objectively score each pattern, with 21 being a perfect total score.[9] Although this group of tests was developed with high-school athletes in mind, its ability to identify individuals at risk has been examined in other settings, including the NFL.


Image 1

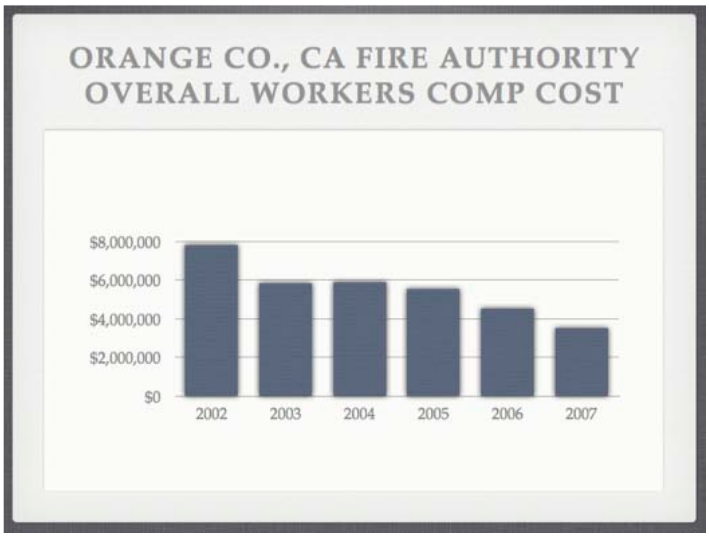


**Image 2: A Southern California fire department noted marked reduction in worker's compensation costs after introducing a wellness program that incorporated FMS.**

Initial findings within the NFL indicated that players who scored 14 or below were 2.2 times more likely to be injured and that players who presented with asymmetries were 1.8 times more likely to be injured.[10] NFL research also revealed that if a player had an FMS score of 14 or less, the probability of a time-loss injury increased from 15 percent to more than 50 percent.[11] Much like the NFL, the fire service invests in training, maintaining and protecting their personnel and they, too, have begun to investigate the effectiveness of FMS utilization.

In 2007, Peate et al. published a study that involved 433 firefighters. One of its purposes was to examine the effectiveness of interventions that were based on FMS data. Once screened, firefighters participated in a multifaceted program that included exercises designed to improve flexibility and core strength. During a 12-month period, time loss due to injury was reduced by 62 percent, and the total number of injuries was reduced by 42 percent.[12] Also in 2007, Captain Michael A. Contreras of the Orange County Fire Authority (OCFA) compiled data following the implementation of a comprehensive wellness program, which included FMS.

In 2002, Captain Contreras began to develop a wellness program that placed an emphasis on annual physicals, fitness assessments, proper training in regard to workouts, and education. An overall reduction in worker's compensation was noted. However, in 2006 Captain Contreras sought to further lower injury-related costs, and that is when FMS was introduced. Data collection began in 2002 with 786 firefighters. The overall worker's compensation cost being generated at that time was just under $8

million. In 2007, Captain Contreras completed his data collection. By that point, the number of personnel had risen to 828 firefighters, however worker's compensation had fallen to just below $4 million. (See Image 2.) Injury cost per employee dropped from about $10,000 to under $5,000, as did cost per injury, falling from approximately $22,500 to around $7,500.[13] These findings primarily reflect the effectiveness of a multifaceted wellness program. Captain Contreras would continue to investigate the components of an effective wellness program, this time focusing his attention on FMS.

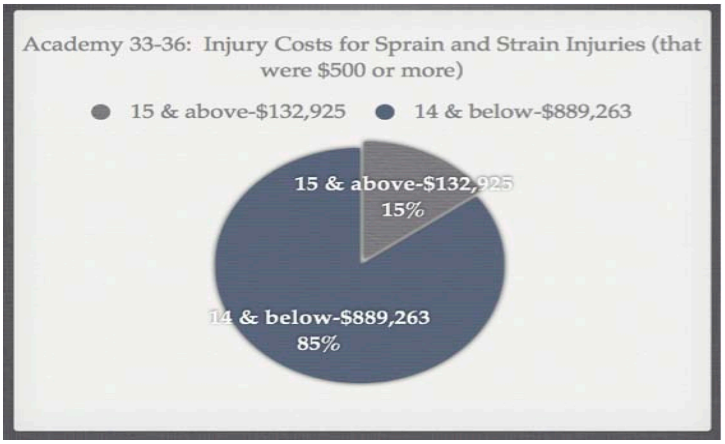


Image 3

As wellness and fitness coordinator, and later as academy coordinator, Captain Contreras remained concerned with the toll that injuries were taking on OCFAs personnel and system. As academy coordinator, he continued to investigate how FMS could decrease the rate of injury, increase individual work capacity, and protect not only fire-service personnel, but also the department's budget. He screened a total of 112 recruits who participated in academies 33–36 and incorporated corrective exercises into their physical training. The data revealed that recruits who scored 14 or below were three times more likely to become injured. When tower times were compared, the 14 and below recruits also demonstrated a decreased work capacity when compared to recruits who scored 15 or higher. Following the academy, all recruits were then monitored within the system for two to three and a half years, depending upon when they had completed their training.[14]

Recruits were broken into two groups: those who scored 14 and below and those who scored 15 and above.

| Recruits | FMS ™ Score | |
|---|---|---|
| 113 Recruits | 14 or less | 15 or more |
| Number | 53 | 59 |
| Percentage | 47% | 53% |

Criteria were established for the medical claims. The claims analyzed were those that could be classified as sprain/strain injuries and exceeded $500 in cost. A total of 43 claims were analyzed, with a distribution as follows:

| Recruits | Recruits Involved in Injuries Analyzed | |
|---|---|---|
| 113 Recruits | 14 or less | 15 or more |
| Number | 31/53 | 12/59 |
| Percentage | 58% | 20% |

As the data shows, 58 percent of the 14 and under group reported injuries that met the claim criteria, while only 20 percent of the 15 and over group generated these types of claims. The differences between these two groups became even more apparent when the actual claim costs were examined.[15]

While the 15 and over group (59 recruits) was slightly larger than the 14 and under group (53 recruits), *the 14 and under group generated more than*

*six times the worker's compensation cost when compared to the 15 and over group.* (See Image 3.) Upon further analysis of the claims, it was also noted that the injuries sustained by the 14 and under group had a higher average cost. While 45 percent of the claims reported by the 14 and under group fell into the $10,000–$350,000 range, 67 percent of the injuries reported by the 15 and over group cost less than $5,000. What these ranges seem to indicate is that not only was the overall cost for the 15 and over group less, but also that the injuries sustained by the 15 and over group were less severe (if based on cost.) Taking it all one step further, average claim costs were then calculated. Consistent with all of the previous findings, the average claim cost for a recruit within the 14 and under group ($28,685) was substantially larger than the average claim cost for a recruit who scored 15 or higher ($11,077.)[16] (See Image 4.)

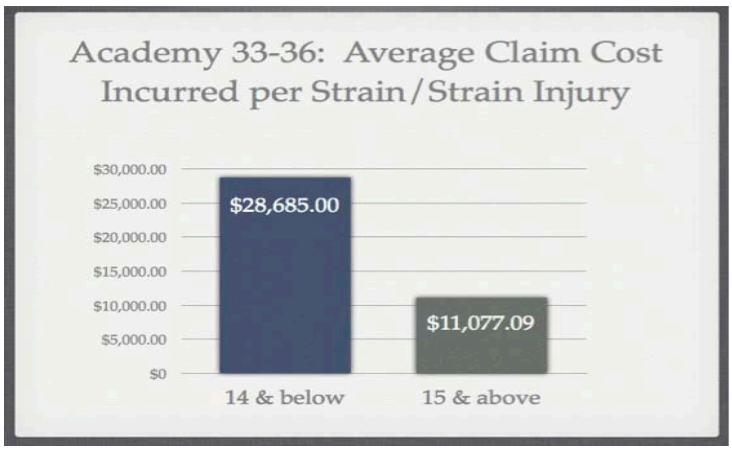


**Image 4**

The existing data regarding FMS and the fire service is extraordinarily compelling. Consistent with the NFL data, a score of 14 or below within the fire service appears to be a significant predictor of injury. The ability to identify the individuals at risk generates an opportunity to intervene. Successful intervention not only benefits the individual firefighter, but also department budgets. What becomes apparent in Captain Contreras' data is that small groups of firefighters with poor movement patterns have the ability to greatly impact department budgets. However, when FMS is included as a component of a comprehensive wellness program, it becomes possible to identify those at risk. Once identified, poor movement patterns can be addressed, which reduces the individual risk and can lead to increased work capacity and a decrease in unfunded liability.

As a clinician, I have had the opportunity to work with injured firefighters. It is a demanding profession and the risks are inherent, but the available data indicates that firefighters with better movement patterns are injured less frequently and less severely. If FMS is utilized to help decrease the rate and severity of injury, it could play a significant role in helping firefighters make it to the end of their careers with less disability and pain. By combining performance testing with FMS, a more complete assessment of human function has been created.[17] The opportunity for a paradigm shift is at hand. What currently exists is an occupation with one of the highest rates of injury trying to manage within a climate of shrinking budgets. The good news is that an evidence-based solution exists. With its ability to gauge movement quality and predict injury, FMS is a standard operating procedure capable of sparing firefighters and city budgets unnecessary harm. BS

*To learn more about the Functional Movement Screen, go to: functionalmovement.com and graycookmovement.com.*

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*rehabilitation and several years as a consultant to Disney. She believes in taking an evidence-based approach to medicine and would like to continue to evolve as an orthopedic preventive medicine specialist. Connie's interest in developing injury-prevention programming for the fire service is the direct result of time spent with firefighters in outpatient rehabilitation, the mounting research indicating the effectiveness of FMS, and Captain Contreras' groundbreaking utilization of this approach in Orange County, Calif.*

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