

AP Stats  
Chapter 11 Review IC

A paper in a 1998 issue of *American Journal of Sports Medicine* examined data regarding the impact age had on the number of days after arthroscopic shoulder surgery before 10 randomly selected weight lifters were able to return to their sport. Computer output for the regression is given below.

Predictor	Coef	SE Coef	T	P
Constant	-5.054	4.355	-1.16	0.279
Age	0.2715	0.1427	1.90	0.094

S = 1.23063      R-Sq = 31.161%      R-Sq (adj) = 22.557%

- 1) Use the computer output to write an equation for the least squares regression line predicting time to return to lifting from an athlete's age.

$\hat{y} = .2715x - 5.054$       X = Athlete's age  
y = time to return to lifting

- 2) One 28 year-old weight lifter took 3 days to return to weight lifting. Find the length of time that would be predicted by the regression line then calculate this weight lifter's residuals.

$y = .2715(28) - 5.054$   
 $= 2.548$

$3 - 2.548 = \boxed{.452}$

- 3) Interpret the meaning of the value of s in this context.

The standard deviation for the difference of the observed time to return and predicted time with a given age.

- 4) Interpret  $r^2$  in the context of the problem.

31.161% of the variability of time it takes an athlete to return to lifting after surgery can be explained by the linear relationship between athlete's age and time.

- 5) Run a test to determine if there is a linear relationship between age and number of days to return to weight lifting after arthroscopic surgery. You may assume conditions for inference are met.

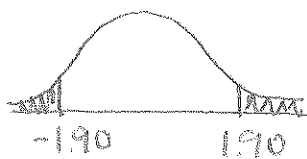
$H_0: \beta_1 = 0$

$H_a: \beta_1 \neq 0$

$\beta_1$  = slope of true regression line btwn age and time to return.

Linear Reg. t-test

$t = \frac{.2715 - 0}{.1427} = 1.90$



p-value = .094

Fail to Reject

$H_0$  b/c p-value > Sign. level of .05.

There is insuff. evidence to suggest a linear relationship btwn. age and time to return to weight lifting.