# Incidence of de Quervain's Tenosynovitis in a Young, Active Population

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**Purpose**  De Quervain's tenosynovitis is thought to occur most frequently in women, with presentation of pain and swelling in the first dorsal extensor sheath. The epidemiology of this extensor tendinitis is not well described. We evaluated the incidence and demographic risk factors for de Quervain's tenosynovitis using a large database of military personnel.

**Methods**  The Defense Medical Epidemiology Database (DMED) collects International Classification of Diseases, 9th Revision, and Clinical Modification (ICD-9-CM) coding information for every patient encounter occurring for United States military personnel. We queried the DMED system by race, gender, military service, rank, and age for the years 1998–2006 using the ICD-9 code 727.04, limiting data to first presentations. Multivariate Poisson regression was used to estimate the rate of de Quervain's tenosynovitis per 1000 person-years, as well as incidence rate ratios and 95% confidence intervals.

**Results**  There were 11,332 cases of de Quervain's tenosynovitis in the population at risk of 12,117,749 person-years. Women had a significantly higher rate of de Quervain's tenosynovitis at 2.8 cases per 1000 person-years, compared to men at 0.6 per 1000 person-years. Age greater than 40 was also a significant risk factor, with this age category showing a rate of 2.0 per 1000 person-years compared to 0.6 per 1000 in personnel under 20 years. There was also a racial difference, with blacks affected at 1.3 per 1000 person-years compared to whites at 0.8.

**Conclusions**  In analysis of a large population, we have described the epidemiology of stenosing tenosynovitis of the first extensor compartment. Risk factors for de Quervain's in our population include female gender, age greater than 40, and black race. *(J Hand Surg 2009;34A:112–115. © 2009 Published by Elsevier Inc. on behalf of the American Society for Surgery of the Hand.)*

**Type of study/level of evidence**  Prognostic II.

**Key words**  de Quervain's, tenosynovitis, epidemiology, military.

STENOSING TENOSYNOVITIS OF the first extensor compartment of the wrist is known as de Quervain's disease. The tendons of the abductor pollicis longus and extensor pollicis brevis are noted to have restricted painful motion at the fibro-osseous sheath in which they travel, just proximal to the radial styloid.[1] In 1895, de Quervain described this type of tenosynovitis, which he treated surgically by division of the tendon sheath at the wrist.[2]

De Quervain himself noted that this malady affects women more commonly, a finding that has been described mainly in case series of the results of surgical treatment.[2,3] One estimate is that de Quervain's is 6

times more common in women than in men.[1] De Quervain's tenosynovitis has also been noted in pregnant and lactating women, with a similar clinical presentation that is generally self limited.[4]

The incidence of de Quervain's tenosynovitis is not well known. The primary sources of data on this problem are derived from studies on upper extremity disorders in industry. In a study at the Vauxhall Motors factory in Britain, researchers reported an approximate incidence of 40 cases of mainly radial extensor tenosynovitis in 12,000 workers over 9 years.[5] This diagnosis included pain and inflammation of the radial wrist extensors. In a report using National Health Interview Survey data over a 12-month period, Tanaka et al. noted a prevalence of tendinitis—which included synovitis, lateral epicondylitis, and de Quervain's disease—at 0.31 per 1000 in U.S. workers.[6] A study that segregated de Quervain's as a specific diagnosis, based on the working population in the Loire region of France, noted that over 2 years, 23 of 1,119 females presented with this diagnosis, compared to 11 of 1,566 men.[7]

There is a paucity of epidemiologic data on de Quervain's tenosynovitis. The goals of our study were to determine the incidence of de Quervain's using a large military database and to analyze demographic risk factors.

## MATERIALS AND METHODS

The Defense Medical Epidemiology Database (DMED) maintains ICD-9-CM coding information for every patient encounter occurring in the population of active duty U.S. service members. The DMED database also incorporates the total number of U.S. service members on active duty at any given time. This database also contains patient demographic and military-specific data that may be used for epidemiological purposes.

To determine the total number of presentations of de Quervain's disease, we queried the DMED system by race, gender, military service, rank, and age, for the years 1998–2006 using the ICD-9-CM code 727.04, radial styloid or de Quervain's tenosynovitis. Institutional review board approval was obtained for this study. The service branch categories were Army, Navy, Air Force, and Marines. The rank categories we used were junior enlisted (E1–E4), senior enlisted (E5–E9), junior officer (O1–O3), and senior officer (O4–O9). The age categories used were <20, 20–24, 25–29, 30–34, 35–39, and ≥40. Inpatient data were excluded to capture only ambulatory encounters. Events were confined to a "first occurrence," to exclude repeat coding of the same initial injury for all services during the study period. The database was also queried for the total number of service members on active duty during the study time period by race, gender, service, rank, and age. One exposure year was defined as 1 year that the service member was in the military.

We used multivariate Poisson regression to estimate the rate of de Quervain's tenosynovitis per 1000 person-years, controlling for covariates. Using Poisson regression analysis, we computed rate ratios for gender, using male patients as the referent category and controlling for differences in age, race, service, and rank between male patients and female patients. Similarly, regression analysis and adjusted and unadjusted rate ratios were calculated for age, using age <20 years as the referent, and for race, using whites as the referent group. All statistical analyses were performed using software (SAS Institute, Cary, NC).

## RESULTS

A total of 11,332 cases of de Quervain's tenosynovitis were documented in our population at risk of 12,117,749 person-years. This equates to an unadjusted incidence rate in our population of 0.94 per 1000 person-years.

The effect of gender as a demographic risk factor was significant. The unadjusted incidence rate for male patients was 0.62 per 1000 person-years, compared with 2.81 for female patients ($p < .0001$). The adjusted incidence rate ratio for females, with male patients as the referent category, was 4.45 (95% confidence intervals [CI] 4.28, 4.62) while controlling for race, age, service, and rank (Table 1).

Age also had a significant effect on de Quervain's incidence, with older patients predominating. The highest incidence rate was seen in the ≥40-year-old group, with an incidence rate of 1.37 per 1000 person-years. The adjusted incidence rate ratios for all older groups were significant when compared to the <20-year-old group, with the ≥40-year-old group having the highest incidence rate ratio at 3.65 (95% CI 3.26, 4.09; $p < .0001$) (Fig. 1).

Race also had an impact on incidence rates, with non-white race being a risk factor. The incidence rate for whites was 0.82 per 1000 person-years, compared with others at 1.03 and blacks at 1.31. The adjusted incidence rate ratio with white race as the referent category was 1.31 (95% CI 1.21, 1.42) for black race and 1.17 (95% CI 1.05, 1.25) for others (Table 2).
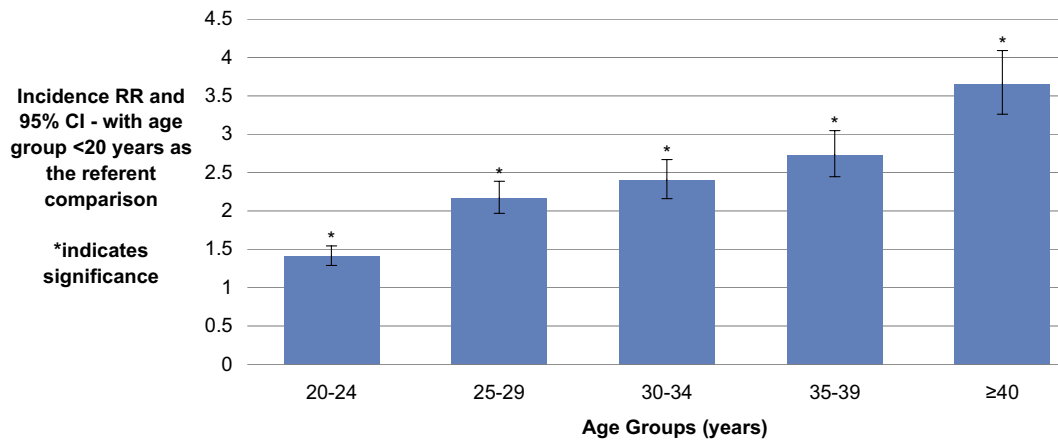
## DISCUSSION

Despite its frequent presentation as an upper extremity musculoskeletal problem, the epidemiology of de Quervain's tenosynovitis is not well known. It is thought to occur more frequently in women between the ages of 20 and 40,[8] including the variant that occurs during

**TABLE 1.  Unadjusted and Adjusted Incidence Rates and Rate Ratios of de Quervain's Tenosynovitis by Gender Among U.S. Service Members Between 1998 and 2006**

| Gender | Injuries | Person-Years | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| | | | Rate | Rate Ratio (95% CI) | Rate | Rate Ratio (95% CI) |
| Male | 6,376 | 10,351,762 | 0.6159 | n/a | 0.5350 | n/a |
| Female | 4,956 | 1,765,987 | 2.8064 | 4.5563 (4.3902, 4.7285) | 2.3799 | 4.4487 (4.2810, 4.6231) |

Rate per 1000 person-years; male referent category; adjusted for race, age, service, rank.



Incidence RR and 95% CI - with age group <20 years as the referent comparison

*indicates significance

**FIGURE 1:** Incidence rate ratio and 95% confidence intervals by age group.

**TABLE 2.  Unadjusted and Adjusted Incidence Rates and Rate Ratios of de Quervain's Tenosynovitis by Race Among United States Service Members Between 1998 and 2006**

| Race | Injuries | Person-Years | Unadjusted | | Adjusted | |
|---|---|---|---|---|---|---|
| | | | Rate | Rate Ratio (95% CI) | Rate | Rate Ratio (95% CI) |
| Black | 3,168 | 2,417,075 | 1.3107 | 1.6080 (1.5418, 1.6770) | 1.1975 | 1.3099 (1.2056, 1.4231) |
| Other | 1,226 | 1,188,909 | 1.0312 | 1.2651 (1.1906, 1.3443) | 1.1869 | 1.1744 (1.1047, 1.2484) |
| White | 6,938 | 8,511,765 | 0.8151 | n/a | 1.0107 | n/a |

Rate per 1000 person-years; white referent category; adjusted for gender, age, service, rank.

pregnancy and the postpartum period.[9] Beyond this, little information on the demographic distribution of de Quervain's disease is available. In an industrial medicine study, Thompson et al. noted that 544 factory workers (in a population of 12,000) presented with "crepitating peritendinitis" over a 9-year period, primarily on the radial side of the wrist. This represents an incidence rate of radial-sided tenosynovitis of 45 per 1000 person-years; however, this diagnosis was not specific for de Quervain's and included problems with the wrist extensors as well as intersection syndrome.[5]

In a survey based on the United States National Health Interview Survey, de Quervain's disease was included in a global diagnosis of tendinitis, which was defined to include epicondylitis, ganglion, trigger finger, and other tenosynovitis diagnoses. The estimated incidence in the U.S. population of this encompassing diagnosis category was 0.31 per 1000 person-years.[6] It is difficult to apply these data to de Quervain's disease because of the combination of this diagnosis with so many other upper extremity disorders.

In an epidemiologic analysis of upper extremity

musculoskeletal issues in French workers, Roquelaure et al. reported data from a surveillance system used in a network of occupational physicians who performed mandatory health examinations of all salaried workers in a 2-year period. These authors noted that rotator cuff problems had the highest incidence, whereas de Quervain's had the lowest. The overall occurrence of de Quervain's tenosynovitis was 34 workers, 23 women and 11 men, in a population denominator of 2,685 workers surveyed (incidence of 6.3 per 1000 person-years). The ratio of de Quervain's occurrence in women compared to men was 3 to 1.[7]

In our study, using a large military database, we noted a rate of de Quervain's tenosynovitis of 0.93 per 1000 person-years, with a denominator of more than 12 million person-years. This likely represents a more realistic estimate of the frequency of de Quervain's disease because of the large sample size and 8-year period of surveillance. In addition, this study confirms the gender differential for de Quervain's, with women at a significantly higher risk of de Quervain's tenosynovitis at 2.8 cases per 1000 person-years, compared to men at 0.6 per 1000 person-years ($p < .0001$). The adjusted incidence rate ratio of 4.45 (95% confidence intervals (CI), 4.28, 4.62) for women indicates that female gender is a risk factor for de Quervain's disease.

In the analysis of age groups, we found the highest incidence rate in the group ≥40 years of age, with an occurrence rate of 1.37 per 1000 person-years, compared to the service members <20 years of age, who had an incidence rate of 0.57 per 1000 person-years (Fig. 1) The adjusted rate ratio of the ≥40 age group compared to the youngest age group was 3.65 (95% CI 3.26, 4.09), a significant difference ($p < .0001$). This is comparable to a previous series of 300 patients with de Quervain's, with an average age of 46 years in 246 women and 54 men.[10] Other studies have noted the peak age group affected by de Quervain's to be somewhat younger. Rossi et al. reported on de Quervain's in volleyball players with an average age of 24 years.[8]

We noted a higher incidence of de Quervain's tenosynovitis in association with blacks compared to whites, at a rate ratio of 1.31 in blacks compared to 0.81 in whites. The rate ratio showed a significant difference between incidence of de Quervain's in whites and blacks (adjusted rate ratio 1.31, 95% CI 1.21, 1.42, $p < .0001$). This finding has not been described previously.

The limitations of this study include the unique characteristics of military personnel as the population at risk, as well as the inherent limitations of a database study. The military as a study cohort has demographic differences from the general U.S. population, notably in racial, age, and gender proportions, as well as differences in activity levels. However, this population has the advantage of a closed health care system, providing an excellent population for epidemiologic study.

Another weakness of our study is that we used a database that depends on the accuracy of the coding of each clinical encounter. Use of the ICD-9 code 727.04, radial styloid tenosynovitis, should be specific for de Quervain's tenosynovitis, but it could be used for coding of radial-sided tendinopathies such as intersection syndrome. In addition, correlative data such as concurrent pregnancy, postpartum status, or athletic and military activities are not available within this database but would be useful in the interpretation of our results.

In this study, we performed an epidemiologic analysis of de Quervain's tenosynovitis with the largest population sample reported to date. This study confirms previous anecdotal beliefs that this entity occurs far more frequently in women. In addition, our data suggest that age ≥40 and black race represent risk factors in the occurrence of de Quervain's tenosynovitis. These findings are clinically relevant in that this entity should be considered in the differential diagnosis in women presenting with wrist pain. These data, including risk factors, can help to predict the proportion of patients in workers' compensation and disability claims panels with this type of tendinitis.

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